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United States
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Tongass
National
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R10-MB-423

November 2000



Cholmondeley Timber Sales

Draft Environmental Impact Statement

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United States
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Service

Alaska Region
Tongass National Forest

Craig Ranger District
P.O. Box 500
Craig, AK 99921

File Code: 1950

Date: November 3, 2000

Dear Reviewer:

Attached is your copy of the Draft Environmental Impact Statement for the Cholmondeley Timber Sale on Prince of Wales Island on the Craig Ranger District of the Tongass National Forest. This document describes one no-action alternative and four action alternatives ranging from approximately 23.4 to 35.2 million board feet of timber harvest. At this point, our preferred alternative is Alternative 5, which proposes to harvest approximately 35.2 MMBF on 1,511 acres, and construct 22.3 miles of specified road and three log transfer facilities.

The comment period on the Draft EIS will be a minimum of 45 days from the date of publication of the notice of availability in the Federal Register, anticipated to be December 1st 2000. The deadline for comments is anticipated to be January 15th 2001. The Final EIS is expected to be completed in spring 2001.

Federal court decisions have established that reviewers of a Draft EIS must structure their participation so that it is meaningful and alerts an agency to the reviewer's position and contentions. Environmental objections that could have been raised at the Draft stage may be waived if not raised until after completion of the Final EIS. This is so substantive comments and objections are made available to the Forest Service at a time when it can meaningfully consider them and respond to them in the Final EIS.

As the Forest Supervisor, I am the responsible official for this project. As a result, I will be deciding whether or not timber harvest will occur in the Cholmondeley Project Area at this time. Furthermore, if timber harvest does occur, I will be deciding where and how it occurs, if and where roads are developed, and what mitigation measures are required.

Please send written comments to Dale Kanen, District Ranger, or Gary Lawton, Team Leader, Attn: Cholmondeley EIS, USDA Forest Service, P.O. Box 500, Craig, AK 99921; or to the e-mail address: glawton@fs.fed.us. You may also call (907) 826-3271 for additional information or if you would like additional copies of the Draft EIS.

Sincerely,

Fred S. Salinas
for THOMAS PUCHLERZ
Forest Supervisor



Cholmondeley Timber Sales

Draft Environmental Impact Statement

United States Department of Agriculture
Tongass National Forest
Ketchikan, Alaska

Lead Agency	USDA Forest Service Tongass National Forest
Responsible Official	Tom Puchlerz, Forest Supervisor Tongass National Forest Federal Building Ketchikan, Alaska 99901
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Abstract

The Forest Service is proposing to implement the Tongass Forest Plan by harvesting timber in the Cholmondeley Project Area. This Draft Environmental Impact Statement describes the effects of four "action" alternatives for harvesting timber and one "no action" alternative. The action alternatives would make from 23 to 35 million board feet of timber available for harvest within the Cholmondeley Project Area on the Craig Ranger District. The significant issues addressed by the alternatives and the EIS include: 1) potential effects to Saltery Cove; 2) potential effects to Clover Bay; 3) potential effects to Sunny Cove; 4) timber sale economics and supply; and 5) roadless character.

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Summary

Figure 1

Figure 2

Figure 3

Figure 4

Summary

Project Area

The Cholmondeley Project Area is located approximately 25 air miles west of Ketchikan, Alaska. It encompasses an area of south Prince of Wales Island that extends from Skowl Arm to Cholmondeley Sound. The Cholmondeley Project Area is within the Craig Ranger District of the Tongass National Forest, Alaska.

Proposed Action

The Forest Service proposes to harvest approximately 37 million board feet (MMBF) – 74,000 hundred cubic feet (cunits) – of timber from 1,511 acres of National Forest. Unit prescriptions would be clearcuts with reserve trees and two-aged harvest systems. Units would be yarded using helicopter, cable, and ground-based equipment. This timber harvest would require construction of about 26 miles of new road and three new log transfer facilities (LTF's). An access and travel management plan would be developed for the project area to guide road system management.

Three small old-growth reserves would be compared to the criteria in Appendix K of the Forest Plan. Any modifications of the old-growth reserves would be documented as a non-significant amendment to the modified 1997 Tongass Land and Resource Management Plan (Forest Plan).

Decisions to be Made

The Record of Decision (ROD) for the Forest Plan established that timber harvest is appropriate in the Cholmondeley Project Area. The Tongass Forest Supervisor will decide:

- The location, design, and scheduling of any timber harvest, road construction, log transfer facilities, and silvicultural practices;
- Access management measures (road, trail, and area restrictions and closures);
- Mitigation measures and monitoring requirements;
- Whether there may be a significant possibility of a significant restriction to subsistence uses; and
- Whether proposed changes to the small old-growth reserves should be approved as a non-significant amendment to the Forest Plan.

Purpose and Need

The purpose and need for the proposed action is to respond to the goals and objectives identified in the Forest Plan for the timber resource. The proposed action will help move the project area toward the desired future condition. The reasons for scheduling timber harvest in this area at this time are discussed in Appendix A of this environmental impact statement (EIS).

The Forest Plan identified the following goals and objectives:

1. Manage the timber resource for production of saw timber and other wood products from suitable timber lands made available for timber harvest, on an even-flow, long-term sustained yield basis and in an economically efficient manner (Forest Plan, Page 2-4).
2. Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the market demand for the planning cycle.
3. Provide a diversity of opportunities for resource uses that contributes to the local and regional economies of Southeast Alaska (Forest Plan, Page 2-3).
4. Support a wide range of natural resource employment opportunities within Southeast Alaska's communities.
5. Maintain healthy forest ecosystems; maintain a mix of habitat at different spatial scales capable of supporting the full range of naturally occurring flora, fauna, and ecological processes native to Southeast Alaska (Forest Plan, Page 2-2).
6. Ensure that the reserve system meets the minimum size, spacing, and composition criteria described in Appendix K of the Forest Plan.

Public Scoping

"Public scoping" is the term used to describe the process of identifying the significant issues for a project. Interested individuals and agencies are contacted to determine their concerns. The following is a summary of the letters, meetings, and contacts that took place during this project:

July 1997: Notice of Intent to prepare an EIS published in the Federal Register.

August 1997: Scoping letter sent out to identify issues.

August 1997: Project notice published in the Ketchikan Daily News and Island News.

September 1997: Public meetings held in Saltery Cove and Ketchikan.

March 1999: Public meeting held in Saltery Cove.

September 1999: Public meetings held in Saltery Cove and Ketchikan.

October 1999: Public meeting held in Kasaan.

March 2000: Public meeting held in Ketchikan.

A number of additional smaller meetings were held with individuals, agencies, and organizations, including the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and Department of Environmental Conservation.

Project Issues

Significant issues for the Cholmondeley Project were identified through public and internal scoping. Similar issues were combined into one statement where appropriate. The following five significant issues were identified and form the basis of the alternatives to the proposed action.

Issue 1: Potential Effects to Sallery Cove

The residents and lodge owners in Sallery Cove are concerned about the potential impacts of timber harvest on: domestic water supply, scenic quality, wind patterns, mooring safety and disturbance associated with new roads.

Issue 2: Potential Effects to Clover Bay

The Clover Bay Lodge is a floating lodge that moors seasonally in Clover Bay. The owners of the lodge are concerned about the effects of timber harvest and associated activities on the scenic quality of the bay, disturbance of their clients' experience, and domestic water supply.

Issue 3: Potential Effects to Sunny Cove

The residents of Sunny Cove are concerned about the potential impacts of timber harvest on: domestic water supply, scenic quality, changes of wind patterns, and mooring and property safety. They are also concerned that increased road access would increase competition for subsistence resources.

Issue 4: Timber Sale Economics and Supply

Concerns were expressed about the economic viability of timber sales. More complex unit prescriptions on difficult terrain may affect the amount of timber available to meet Southeast Alaska market demands. Of additional concern is the effect timber harvest would have on local employment and revenues.

Issue 5: Roadless Character

The entire project area is located within the McKenzie Roadless Area, and is largely undeveloped. Concerns were expressed that timber harvest and road construction would change the undeveloped character of the roadless area. Proposed development could affect access patterns and future management.

Alternatives

The significant issues were used to develop alternatives to the proposed action.

Alternative 1 (No-Action)

Alternative 1, the no-action alternative, analyzes the effects of not harvesting timber and building roads or LTF's in the project area at this time (Figure 2-1, Chapter 2).

Alternative 2

Alternative 2 responds to the issue of building roads in an unroaded area of the National Forest. It also addresses the domestic water and security issues because stream crossings and roads would not be necessary. This alternative would harvest

approximately 35 MMBF of timber from 1,511 acres. All harvested timber would be yarded using helicopters and no roads or LTF's would be constructed (Figure 2-2, Chapter 2).

Alternative 3

Alternative 3 addresses the issues of the two communities and the Clover Bay Lodge. No roads would be built across streams used for domestic water. Therefore, no roads or LTF's would be built in the Saltery Cove or Clover Bay areas. About 5 miles of road and one LTF would be built east of Sunny Cove. Approximately 33 MMBF of timber would be harvested from 1,489 acres under this alternative. Most units would be yarded using helicopters except those accessed by road. Those units accessed by road would be yarded with cable and ground-based equipment (Figure 2-3, Chapter 2).

Alternative 4

Alternative 4 responds to the issues of timber sale economics and supply. This alternative emphasizes developing economically efficient timber sale packages. Approximately 23 MMBF of timber would be harvested from 941 acres. Units would be yarded with helicopters, cable systems, and ground-based equipment. Approximately 16 miles of road and 3 LTF's would be constructed to facilitate timber harvest (Figure 2-4, Chapter 2).

Alternative 5 (Preferred)

Alternative 5 attempts to achieve the timber volume outputs predicted in the Forest Plan and meet the minimum standards and guidelines. Approximately 37 MMBF of timber would be harvested from 1,511 acres. Units would be yarded with helicopters, cable systems, and ground-based equipment. Approximately 22 miles of road and 3 LTF's would be constructed to facilitate timber harvest (Figure 2-5, Chapter 2).

Mitigation Measures For All Action Alternatives

The mitigation measures for all of the action alternatives are described in Chapter 2 and Appendix D of this EIS.

Comparison of Alternatives

Issue 1: Potential Effects to Saltery Cove

Domestic Water

Alternative 1 would have the least adverse impact on the streams used for domestic water since no roads would be constructed or timber harvested.

Alternatives 2 and 3 would have the least adverse effects of the action alternatives. No roads would be constructed under both of these alternatives and the harvest units would be yarded using helicopters. Therefore, stream crossings or road related adverse effects would not accrue to the streams used for domestic water. Yarding logs with full suspension would cause the least soil disturbance of the action alternatives.

Alternative 3 would have fewer effects than Alternative 2 because more ground cover and approximately 20 percent more of the standing volume would be left in the units.

Possible adverse effects would be the same for Alternatives 4 and 5, as both alternatives have the same road design and silvicultural prescriptions. Harvest units would be yarded by partial suspension cable systems. These yarding systems have a higher potential to cause soil disturbance than those used in Alternatives 2 and 3.

Scenery

In Alternative 1, no changes in scenery associated with timber harvest would occur around Sallery Cove or Swan Lake. Alternative 3 would have the least adverse effect of the action alternatives because of the additional trees left standing in the units under the two-aged management system. Alternative 2 would have slightly more visual impact because more even-aged clearcuts with reserves would be prescribed. Alternatives 4 and 5 would most modify the scenery around the cove and Swan Lake. All alternatives meet a higher visual quality standard than required in the Forest Plan (see Chapter 3). The McKenzie Inlet LTF would have an adverse visual effect at the entrance of the inlet that would not meet the visual quality standard.

Lodge Business

None of the alternatives would affect saltwater fishing. Alternative 1 would have no adverse effect on the Sportsman's Cove Lodge. Alternatives 2 and 3 would have similar effects on the lodge. There would be some disturbance in the cove where helicopters drop logs. This disturbance would be limited to the hours between 7 a.m. and 3 p.m., when most lodge clients are salt water fishing. Alternatives 4 and 5 would also have similar effects. There would be less disturbance to the cove than in Alternatives 2 and 3 but more disturbance to McKenzie Inlet. Dust and noise associated with vehicle traffic may be seen and heard from Swan Lake but would not likely effect the cove residences.

Community Privacy and Security

Alternatives 1, 2 and 3 would have no effect on access since no roads would be built. Hiking activity may increase on the road constructed under Alternatives 4 and 5 after the road is closed following post-harvest activities.

Wind

Wind pattern changes would not be the result of timber harvest under Alternative 1. Wind effects would be similar for all action alternatives because the volume harvested under each alternative is similar. Possible wind pattern changes resulting from timber harvest are not expected to have adverse effects on the residences or mooring in Sallery Cove. Wind throw may occur along the edges of buffers, units, or road corridors but harvested openings are not expected to increase wind velocity. Mitigation measures (see Appendix D) and the forested area between the harvest units and Sallery Cove would impede wind velocity before it reached the cove.

Issue 2: Potential Effects to Clover Bay

Scenery

Alternatives 1 and 3 would have no adverse effects on the scenery of Clover Bay since no timber harvest would be visible from the bay. The backline and part of one unit would be seen from the south side of Clover Bay in Alternatives 2, 4 and 5. Alternatives 4 and 5 would have the additional visual impact of the LTF from the south, southwest entrance of the bay. All alternatives meet the VQO or higher standard than required in the Forest Plan.

Three units would be visible from Clarence Strait in Alternatives 2, 3, and 5. These units would be slightly more visible under Alternative 5 due to the cable corridors. No changes in scenery would occur under Alternatives 1 and 4. No timber harvest occurs under Alternative 1 or north of Monie Lake under Alternative 4.

Lodge Business

Under all alternatives, there would be no adverse effects to the saltwater fishery or wildlife habitat in Clover Bay. Alternatives 1 and 3 would have the least effect on the Clover Bay Lodge as no timber harvest or associated activities would be visible from the bay. Alternative 2 may compromise lodge business slightly more than Alternatives 1 and 3 because part of one unit would be visible. Alternatives 4 and 5 would have the highest potential for negative effects because of the additional visual effect of the LTF and disturbance associated with logging activities.

Domestic Water

No adverse effects to the stream used for domestic water would occur under any alternative. No harvest would occur in the domestic water watershed under Alternatives 1 and 3. Timber harvest would occur in the upper end of the watershed in Alternatives 2, 4 and 5. A road would be built to access the unit under Alternatives 4 and 5 but it does not cross the stream. The distance between the unit and stream used for domestic water, and the gently rolling terrain make it unlikely that sediment or petroleum products would enter the stream.

Issue 3: Potential Effects to Sunny Cove

Domestic Water

Alternative 1 would have no adverse effects on the drinking water supply since no timber harvest would occur. A small tributary to the stream used for drinking water flows through one unit under Alternative 2. The wide, windfirm buffer along the tributary and yarding the unit with helicopters would prevent harvest related sediment from entering the stream. Alternatives 3, 4 and 5 would all have similar effects. Mitigation measures (Appendix C and Appendix D) would prevent sediment and petroleum products from entering the tributaries and drinking water stream.

Scenery

Alternative 1 would not change the scenic quality of Sunny Cove since no timber harvest would occur. The scenery around Sunny Cove would be modified under Alternatives 2, 3, 4 and 5 but all changes would meet the VQO or higher standard required in the Forest Plan. Alternatives 3, 4 and 5 would have additional scenic effects related to the LTF. The VQO of this development would still meet Forest Plan standards of Maximum Modification.

Alternatives 1 and 4 would not change the scenic quality as seen from West Arm of Cholmondeley Sound since no units would be harvested under either alternative. Alternatives 2, 3, and 5 would modify the scenery of this area but would meet the Forest Plan standard for visual quality.

Community Privacy and Security

Alternatives 1 and 2 would not change access into Sunny Cove, so privacy and security would remain static. Residents of Sunny Cove would notice increased activity around the cove but not directly near their homes. Alternatives 3, 4, and 5 would have similar effects because roads are used to access timber. The roads are approximately ¼ mile from Sunny Cove residences and would be closed to motorized use following timber sale activities.

Subsistence

We expect no changes in deer abundance and distribution under any alternative of the Cholmondeley Project. We expect no changes in the subsistence use of the area under

Alternatives 1 and 2 since no roads would be built under Alternative 2. The LTF in Alternatives 3, 4 and 5 would provide an additional access point and may locally increase hunting pressure.

Wind

The alternatives were designed to reduce the potential of winds increasing speed through units. Unit size and orientation relative to prevailing winds would prevent possible changes in wind patterns and adverse effects on the moorage and residences of Sunny Cove. Since the prevailing winds are from the south-southeast, none of the units north and west of Sunny Cove would contribute to possible wind effects on the residences or moorage. The 1,000-foot beach buffer would be left intact and would mitigate any unforeseen wind aberrations.

Issue 4: Timber Sale Economics and Supply

In the Cholmondeley Project Area, up to 1511 acres of suitable and available timberland are proposed for harvest. Alternatives 2 and 5 would provide the highest timber volume (approximately 35.2 MMBF, or 70,400 cunits). Alternative 3 provides slightly less timber volume (33.4 MMBF, or 66,800 cunits), and Alternative 4 supplies the least volume (23.4 MMBF, or 46,800 cunits). Alternative 1 would not provide any timber volume. Right-of-way volume is not included in these estimates.

The economic viability of the timber sale is of concern to industry and the public. In Chapter 3 the high and low market values are compared. Alternatives 2 and 3 produce negative stumpage values under both the high and low market conditions (Alternative 2 - lowest). Alternatives 4 and 5 produce positive stumpage values in both high and low market conditions (Alternative 4 - highest).

Stumpage values were also compared across the five planned sale areas. In all cases helicopter yarding distances had major effects, producing negative values on almost all sales at the low market conditions. Cable yarding produced positive values for all sales. Yarding distances also influenced helicopter yarding costs greatly. Helicopter yarding costs per sale ranged from \$300 to \$930 per MBF.

All action alternatives in the Cholmondeley Project Area propose timber harvest that is 55 percent NIC I (non-interchangeable component) and 45 percent NIC II.

Issue 5: Roadless Character

The Cholmondeley Project Area covers about 63 percent of the McKenzie Roadless Area. This roadless area has been evaluated under the 1964 Wilderness Act, ANILCA, Tongass Timber Reform Act, the original Tongass Land Management Plan (1979), and the current Forest Plan. Each of these evaluations has left the area open for development. The Forest Plan has designated land use in the area as Timber Production, Old-Growth Habitat, and Modified Landscape. Alternative 1 would keep intact the roadless character and values of the portion of the McKenzie Roadless Area in the project area. Alternatives 2 and 5 both reduce the McKenzie Roadless Area by 9 percent. Alternatives 3 and 4 reduce the area by 8 percent and 5 percent, respectively.

The values of roadless areas – watershed protection, healthy fish populations, wildlife and fish refugia, and intact native plant and animal communities – are discussed in Chapter 3. Overall, these values would be affected to the degree the roadless area is reduced. However, many of the site-specific adverse effects would be mitigated and the components and functions of the ecosystems would remain.

Chapter 1

Purpose and Need

Chapter 1

Introduction to the course

Chapter 1

Purpose and Need

Introduction

The Forest Service has prepared this Environmental Impact Statement (EIS) on the potential effects of timber harvest in the Cholmondeley Project Area in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. The project area is located on the Craig Ranger District of Prince of Wales Island on the Tongass National Forest, Alaska. This EIS discloses the direct, indirect, and cumulative environmental impacts and any irreversible or irretrievable commitment of resources that would result from the proposed action and alternatives.

This EIS is prepared according to the format established by Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508). Chapter 1, in addition to explaining the purpose and need for the proposed action, discusses how the Cholmondeley Project relates to the modified 1997 Tongass Land and Resource Management Plan (Forest Plan), and identifies the significant issues driving the EIS analysis. Chapter 2 describes and compares the proposed action, alternatives to the proposed action, and a no-action alternative, and summarizes the significant environmental consequences by issue. Chapter 3 describes the natural and human environments potentially affected by the proposed action and alternatives, and discloses the potential effects. Chapter 4 contains the list of preparers, the EIS distribution list, literature cited, a glossary, and an index. Appendices provide additional information on specific aspects of the proposed project. This EIS summarizes and references other documented analyses where appropriate.

The interdisciplinary team (ID team) used a systematic approach for analyzing the proposed project and alternatives to it, estimating the environmental effects, and preparing this EIS. The planning process complies with NEPA and the CEQ regulations. Planning was coordinated with the appropriate federal, state, and local agencies, and local federally recognized tribes.

1 Purpose and Need

Proposed Action

A "proposed action" is defined early in the project-level planning process. It serves as a starting point for the ID team, and gives the public and other agencies specific information on which to focus comments. The ID team uses the public and agency comments and information from preliminary analysis to identify the significant issues and develop alternatives to the proposed action.

The Craig Ranger District proposes to sell and harvest approximately 37 million board feet (MMBF) – 74,000 hundred cubic feet (cunits) – of timber from the National Forest in the 74,000-acre Cholmondeley Project Area. About 26 miles of new road and up to three new log transfer facilities would be required to facilitate this harvest. Timber from this project would be offered through the Tongass National Forest timber sale program, through five sales of varying sizes. In addition, adjustments to the boundaries and/or locations of three small old-growth reserves are proposed to meet criteria for wildlife objectives in old-growth reserves (Forest Plan, Appendix K). These adjustments could result in a non-significant amendment to the Forest Plan. The proposed action also includes a road access management plan for the project area. Appendix A of this document provides information on how this project relates to the overall Tongass National Forest timber sale program, and why the project is being scheduled at this time.

Decisions to Be Made

The Tongass Forest Supervisor will decide whether to harvest timber from the Cholmondeley Project Area and, if so, how the timber should be made available. The Forest Supervisor will use this analysis, along with the goals, objectives, and desired future conditions stated in the Forest Plan, as the basis for his decision. The decision will include:

- The location, design, and scheduling of any timber harvest, road construction, log transfer facilities, and silvicultural practices;
- Access management measures (road, trail, and area restrictions and closures);
- Mitigation measures and monitoring requirements;
- Whether there may be a significant possibility of a significant restriction to subsistence uses; and
- Whether proposed changes to the small old-growth reserves should be approved as a non-significant amendment to the Forest Plan.



Prince of Wales Island

Clarence Strait

Thorne Bay

Kasson

Craig

Hydaburg

Ketchikan

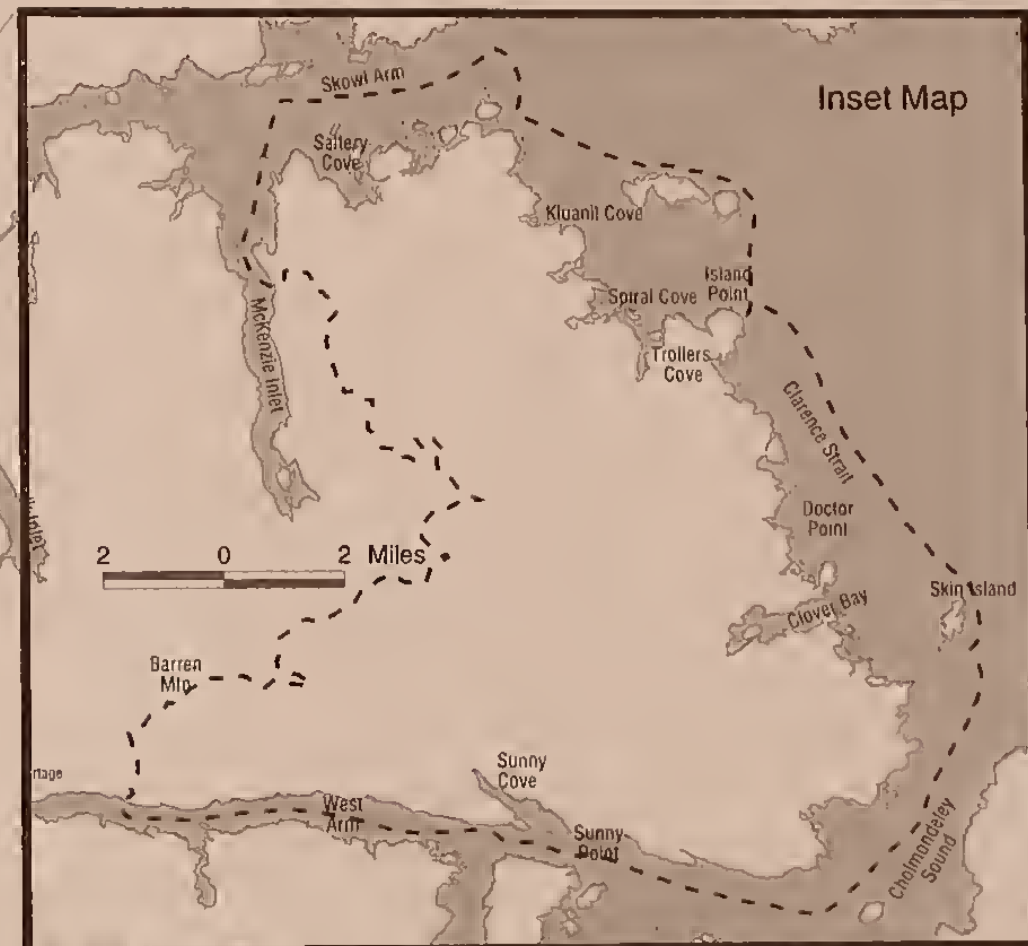
Cape Chacon



U.S.D.A. Forest Service - Alaska Region

"The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. Original data elements were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may not be updated, corrected, or otherwise modified without notification. For additional information about this data, contact Tongass National Forest, Ketchikan Area, Craig Ranger District."

10 0 10 Miles



- - - Project Boundary
- Saltwater
- Project Area (Large View Only)

Cholmondeley
DEIS
November
2000

Vicinity Map
Figure 1-1



Project Area

The Cholmondeley Project Area is approximately 25 air miles west of Ketchikan, Alaska (Figure 1-1). The project area, which is on southeast Prince of Wales Island, extends from Saltery Cove to Sunny Cove and includes Skowl Arm, Trollers Cove, Clover Bay, and Sulzer Portage. This analysis focuses on the land area, which is 52,772 acres of the 74,000-acre project area. The rest of the project area includes bays, coves, and surrounding salt water.

Saltery Cove includes private lands that have eight year-round residents, seasonal residents, and the Sportsman Cove Lodge. Swan Lake is located to the south and east of the lodge and is used by lodge clients and residents for recreation. Trollers Cove has an anchorage and a Forest Service cabin that is available for rent, on a reservation basis. Clover Bay Lodge is a floating lodge moored seasonally in Clover Bay. Sunny Cove includes a parcel of private land that has both seasonal and year-round residences. Some of the residents operate a mariculture facility in the southwest portion of the cove.

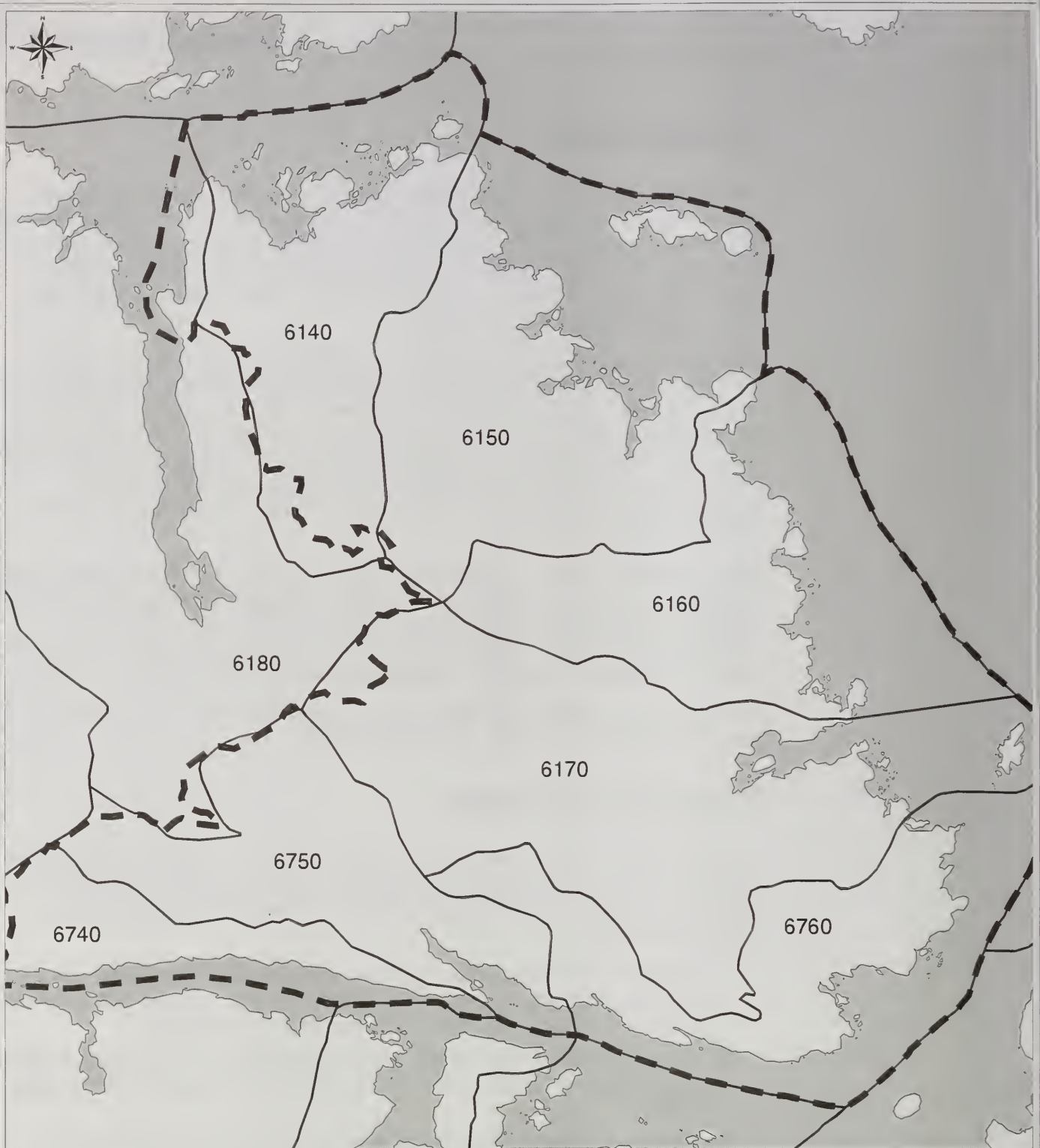
The project area is within the McKenzie Roadless Area (519). In past planning efforts, this area had not been recommended for wilderness designation or non-development management classifications (Roadless Area Report, project file). The land use designations identified in the Forest Plan for this project area are: Timber Production, Old-growth Habitat, Modified Landscape, and Semi-remote Recreation.




The communities of Hollis and Kasaan are located northwest of the project area. Access to the project area is by boat and small plane.

Purpose and Need

The Cholmondeley Project responds to goals and objectives of the Forest Plan, and moves the project area towards the desired future conditions (Forest Plan, pages 2-1 through 2-5). Forest-wide goals and objectives applicable to the Cholmondeley Project Area include:

1. Manage the timber resource for production of saw timber and other wood products from suitable and available timber lands on an even-flow, long-term sustained yield basis and in an economically efficient manner.
2. Seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber, and the market demand for the planning cycle.
3. Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska.
4. Support a wide range of natural resource employment opportunities within Southeast Alaska's communities.
5. Provide a sustained yield of timber and a mix of resource activities while minimizing the visibility of developments in the foreground distance zone.
6. Maintain areas of old-growth forests and their associated natural ecological processes to provide habitat for old-growth-associated resources.



-  Saltwater
-  VCU Boundary
-  Project Boundary

CHOLMONDELEY
DEIS

November 2000
VCU

2 0.0 2 miles

Figure 1-2

Relationship to Forest Plan

National forest planning takes place at several levels: national, regional, forest, and project. The Cholmondeley EIS is a project-level analysis; its scope is confined to addressing the significant issues and possible environmental consequences of the project. It does not attempt to address decisions made at higher levels. It does, however, implement direction from those higher levels.

The Forest Plan embodies the provisions of the National Forest Management Act, its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Tongass National Forest. The Forest Plan is the result of extensive analysis, which is addressed in the Forest Plan FEIS and the April 1999 Record of Decision. The Cholmondeley EIS tiers to the Forest Plan FEIS, as encouraged by 40 CFR 1502.20.

There are 935 acres of encumbered lands in the project area. These lands have been selected by the State of Alaska and Sealaska Corporation but have not yet been conveyed. Though administered by the Tongass National Forest, timber management activities are not planned on these lands and they are not included in the project area analysis.

The Forest Plan uses land use designations (LUD's) to guide management of the lands within the Tongass National Forest. Desired Future Conditions of the four LUD's in the Cholmondeley Project Area are summarized below (Forest Plan, Chapter 3).

Timber Production

These lands are managed for the production of saw timber and other wood products on an even-flow, long-term sustained yield basis. The forested areas are healthy stands with a balanced mix of age classes. An extensive road system is developed for accessing timber as well as recreation, hunting, fishing, and other public and administrative uses. Roads may be closed, either seasonally or yearlong, to address resource needs. Management activities will usually dominate most visible areas. A variety of wildlife habitats, predominately in the early and middle successional stages, are present. Approximately 38 percent of the National Forest System lands in the project area are designated as Timber Production (Table 1-1).

Modified Landscape

Timber harvest and road development are allowed in the mix of resource activities that can occur in this LUD. The timber volume contributes to the Forest-wide sustained yield. The variety of successional stages created through timber harvest provides a range of wildlife habitat conditions. Management activities are subordinate on the landscape as seen in the foreground from popular travel routes and use areas. Management activities may dominate the middle and background landscape. Approximately 12 percent of the National Forest System lands in the project area are designated as Modified Landscape (Table 1-1).

Semi-remote Recreation

The natural environment is generally unmodified in this LUD. Ecological processes and natural conditions are only minimally affected by past or current human uses or activities. Timber harvest and road construction are generally not permitted.

Forest Plan Land Use Designations

1 Purpose and Need

Approximately one percent of the National Forest System lands in the project area are designated as Semi-remote Recreation (Table 1-1).

Old-growth Habitat

In this LUD, old-growth forests are to be maintained and early seral conifer stands are to be managed to achieve old-growth forest characteristics. The objective is to achieve a diversity of old-growth habitat types and associated species, subspecies, and ecological processes. Timber harvest is not permitted except to achieve the LUD objectives. Development of roads and other facilities is avoided. Approximately 46 percent of the National Forest System lands in the project area are designated as Old-growth Habitat (Table 1-1).

Table 1-1: Project Area Land Use Designations and Acreages

Timber Production	Modified Landscape	Semi-remote Recreation	Old-growth Habitat	Other Ownership	Total Land Acres
19,916	6,373	637	24,328	1,518	52,772*

*Includes small islands within the project area.

Forest Plan Standards and Guidelines

The following standards and guidelines delineate spatial areas not available for programmed timber harvest within land use designations that are otherwise available. Each applies to a specific habitat or ecological component. These areas are included within the Semi-remote Recreation, Modified Landscape, Old-growth Habitat and Timber Production designations described above. Applicable Forest-wide standards and guidelines (Forest Plan, Chapter 4) are summarized in Chapter 2.

Beach and Estuary Fringe

The beach and estuary fringe extends approximately 1,000 feet inland from the mean high tide line and occurs along all coastlines. Programmed timber harvest is not allowed and roads are located outside the fringe when possible.

Karst and Caves

Potential karst areas have been identified; these are categorized as low, medium, or high vulnerability. High vulnerability areas are not suitable for programmed timber harvest.

Riparian

Riparian Management Areas are critical habitat areas for fish, other aquatic resources, and wildlife. These areas are delineated according to the process group direction in the Riparian forest-wide standards and guidelines (Forest Plan, pages 4-56 to 4-73). Some riparian boundaries may be adjusted after completion of a project-specific watershed analysis (Forest Plan, page 4-56 and Appendix J). Timber harvest is not scheduled in Riparian Management Areas.

Project Area Desired Future Condition

The desired future conditions described for the Forest Plan land use designations, along with Forest Plan direction outlined above, identify the parameters and define the project-specific desired future conditions. The following description of the desired future conditions for the Cholmondeley Project Area identifies significant issues and guides project management consistent with Forest Plan direction and ecological conditions.

A portion of the Cholmondeley Project Area will have healthy stands of trees and a mix of age classes from young to mature. The project area is characterized by a mosaic of scattered old growth and low-volume/unmerchantable stands interspersed with muskeg and shrublands. The scattered, low-volume stands and rough terrain limit opportunities for commercial timber harvest and road development. Only about eight percent of the land base is available for timber management. Though timber management will contribute towards a distribution of age classes, a balanced distribution may not be attainable in the project area.

Implementation of the Cholmondeley Project would contribute to the timber supply needed to meet market demands. It would provide resource production and local employment in the timber industries. The Forest Service proposes to use harvest methods other than traditional clearcutting. The traditional clearcut would be modified by feathering the unit edges and leaving residual trees and buffer strips in the units. Some stands are harvested using uneven-aged methods. These different treatments would temper the visual and watershed effects of logging. Domestic watersheds are managed to meet or exceed State water quality objectives. Portions of the project area that may influence wind patterns in sensitive areas will be managed to minimize changes to the existing wind patterns.

Road access to units in the Cholmondeley Project Area would be limited to the Timber Production and Modified Landscape LUD's. Rugged terrain prevents this road system from connecting to the rest of Prince of Wales Island or interconnecting between sale areas in the project area. Access to managed areas near private land will address security issues. This access would enhance fishing, hunting, and other recreation opportunities in the Monie Lake area. The Recreation Opportunity Spectrum (ROS) would range from semi-primitive to roaded natural, which exceeds Forest Plan objectives.

Recreation business opportunities, based both on land and water, will continue to exist during and after harvest activities have occurred. Water-based business opportunities, such as mariculture operations, will be encouraged by the Forest Service to the extent its jurisdiction allows.

Old-growth Habitat reserves would retain their old-growth forest characteristics. The diversity of old-growth habitat types and associated species, subspecies, and ecological processes would continue to develop without human interference.

1 Purpose and Need

Scoping

Public Involvement

The Council on Environmental Quality (CEQ) defines scoping as "...an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). The scoping process invites public participation and incorporates public comment in the decision-making process. Through scoping, the Forest Service identifies public issues and develops alternatives to the proposed action that respond to those issues. The scoping process begins early in the analysis and continues until a decision is made. In addition to the following public involvement, the Cholmondeley Project has been listed on the Tongass National Forest Schedule of Proposed Actions and included in the Tongass National Forest 10-Year Timber Sale Action Plan for several years. Both are available on the Internet.

The public has been invited to participate in the project in the following ways:

Notice of Intent (NOI)

A Notice of Intent was published in the *Federal Register* on July 24, 1997, when it was decided that an EIS was to be undertaken for the project.

Public Mailing

In August 1997, a letter providing information and seeking public comment was mailed to approximately 375 individuals and groups that had previously shown interest in Forest Service projects in Southeast Alaska. This included federal and state agencies, Alaska Native governments and groups, municipal offices, businesses, interest groups, and individuals. A total of 42 responses to this mailing were received, and issues were identified for this project.

Local News Media

Announcements about the project were printed in the *Ketchikan Daily News* and *Island News*. A scoping document describing the project was placed in the August 9-10, 1997 weekend edition of the *Ketchikan Daily News* and in the August 11, 1997 edition of the *Island News*.

Public Meetings

Public meetings were held with Saltery Cove, Sunny Cove, Clover Bay, and Kasaan residents in 1997, 1999, and 2000. Several meetings were held in Saltery Cove and Ketchikan. The Forest Service provided project area information, presented the proposed action, and discussed local concerns and interests. The communities' issues were incorporated in the Cholmondeley analysis, and Alternative 3 was developed to address their concerns.

Meetings with Agencies, Native Groups and Others

Other government agencies – including U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, and the Department of Environmental Conservation – attended several ID team meetings. These meetings produced Old-growth Reserve options and developed alternatives. Consultation with National Marine Fisheries Service was accomplished through the Essential Fish Habitat analysis. Other agencies were contacted for technical expertise in water quality and wildlife/fisheries

regulations, and logging capabilities. The community of Kasaan was also consulted on its use of the project area.

Availability of Draft EIS

Availability of this Draft EIS was announced in the Federal Register and through notices in local papers. These notices started a 45-day comment period. EIS documents were also mailed to federal and state agencies, Alaska Native and municipal offices, and anyone else who had requested them.

Issues

Significant Issues

Significant issues for the Cholmondeley Project were identified through public and internal scoping. Similar issues were combined into one statement where appropriate. The following five issues were determined to be significant and within the scope of the project decision. These issues are addressed through the proposed action and alternatives to the proposed action. Additional concerns were considered but determined not to be significant for the project decisions to be made; they are discussed separately.

Issue 1: Sallery Cove

Approximately 8 residences are located on 24 acres of private land in Sallery Cove. In addition, Sportsman's Cove Lodge entertains 1,000 clients annually, generating about \$1,600,000 in gross revenue. The lodge's high-use period spans from June 1 through September.

Domestic Water

Residents and Sportsman's Cove Lodge owners are concerned that timber harvest and road construction would adversely affect their drinking water supplies. They get their drinking water from four streams in the Sallery Cove area. Two of these streams are located on national forest land in areas available for timber harvest and related developments.

Scenic Quality

The residents of Sallery Cove and the Sportsman's Cove Lodge owners are concerned about potential changes to the scenic quality of national forest resulting from timber harvest and associated activities. Lodge clients and local residents enjoy the scenery and solitude while canoeing or hiking around Swan Lake, fishing in Clarence Strait, sightseeing in Sallery Cove and McKenzie Inlet, or relaxing during quiet evenings. The clients' main activity is saltwater fishing outside of the project area; however, the natural scenic backdrop to the south of Sallery Cove is a major part of their "Alaska experience".

Lodge Business

Lodge owners are concerned that harvesting activity and its potential impacts to scenery and water quality would negatively affect lodge business.

1 Purpose and Need

Community Privacy and Security

Local residents identified the following concerns related to community privacy and security:

- Additional road access will disrupt the peace and security of their homes and cabins.
- Roads will promote ATV use and invite more hunters to the area.
- Hunters will shoot firearms close to local homes and cabins.
- Increased access will promote vandalism and theft.

Wind Patterns

Saltery Cove landowners are concerned that large clearcut openings south and west of their lands will compromise the safety of their anchorage by adversely affecting wind patterns in the cove.

Issue 2: Clover Bay

Clover Bay Lodge has averaged 300 clients per year over a 16-year period and generates about \$350,000 per year in gross revenues. About 85 percent of their clients return to the lodge on a regular basis. The lodge operates in the project area for about two and one-half months a year, June through mid-August. No private land is located in Clover Bay.

Scenic Quality

The operators of the Clover Bay Floating Lodge are concerned about potential changes to the scenic quality of national forest north of Clover Bay and to the Bay itself resulting from timber harvest and associated activities. Their clients expect a "pristine" wilderness setting. They believe constructing and operating a log transfer facility (LTF) near the mouth of Clover Bay would affect clients' experiences as they travel to the fishing grounds or view marine mammals in the bay.

Lodge Business

Main activities of the lodge clientele include saltwater fishing, crabbing, and wildlife and sea mammal viewing in Clarence Strait and Clover Bay. The lodge is moved from the area prior to the start of the commercial seine fishing season so their clients won't view the fishing fleet. The owners clean trash out of the bay and are concerned about increases in garbage associated with timber harvest, logging camps, and the LTF's. The lodge owners believe that any evidence of timber harvest, road construction, LTF construction, and associated camp activities would affect their clients "wilderness" experience and cause their lodge business to fail.

Domestic Water

The lodge has a Forest Service permit for shore ties and a water line on national forest. Lodge owners are concerned that harvest activities, road building in particular, would negatively affect the drinking water used for their lodge operations.

Issue 3: Sunny Cove

Six homes are located in Sunny Cove.

Domestic Water

The residents of Sunny Cove are most concerned about the potential effects timber harvest, associated road construction, and potential windthrow may have on the quality of their domestic water. Residents get their drinking water from a stream that flows from National Forest System lands on the north side of Sunny Cove.

Mariculture

The community is concerned about water quality above the mariculture operation on the south side of the cove.

Scenic Quality

The residents enjoy the scenic quality and serenity of the area around Sunny Cove during their variable-length stays throughout the year. They are concerned about the amount of logging that has already occurred south of Cholmondeley Sound within their view. They believe the area around their homes is the only unlogged area remaining.

Privacy/Security

Residents are concerned about the increase and types of use the new roads may bring. They anticipate the roads will invite all-terrain vehicle (ATV) use and provide easier access for hunters. They are concerned that improved access will disrupt the peacefulness of the area around their homes and increase the potential for vandalism. They anticipate an increase in hunting pressure and are concerned about the effects on the security of their homes.

Subsistence

Several residents fish commercially and maintain subsistence life-styles by hunting bear and deer. Most other subsistence activities center around water-based activities in the area. They anticipate an increase in hunting pressure and are concerned about the effects on subsistence use.

Wind

The community perceived wind pattern changes after the expansive clearcut timber harvest on private land south of Cholmondeley Sound. They are concerned that additional harvest will further compromise the cove as a secure anchorage.

Issue 4: Timber Sale Economics and Supply

The project area contains large areas of steep terrain that are difficult to access. The cost of applying more complicated silvicultural prescriptions to log these areas and address resource concerns may compromise the economic viability of the proposal. The amount of timber available for sale from national forest and how the timber supply affects local employment and revenues are other concerns.

Issue 5: Roadless Character

The entire project area is located within the eastern two thirds of the 84,000-acre McKenzie Roadless Area (Forest Plan FEIS, Appendix C). Portions of the roadless area have been designated for development since 1979. The project area portion of the roadless area is a naturally fragmented mosaic of timber, muskeg, and subalpine vegetative types with many lakes. Access into the interior of the roadless area is

1 Purpose and Need

primarily through Saltery Cove, Spiral Cove, Trollers Cove, Clover Bay and Sunny Cove. Floatplane access occasionally occurs at Monie and Clover Lakes. Potential road access to the interior of the area is very difficult due to rugged terrain.

Values include the scenery and solitude being marketed and enjoyed by local businesses and residents, especially when they are engaged in water-based activities. Proposed road building activities could change the recreation use patterns of the alpine areas and lakes by facilitating access to them. Proposed harvest activities could also affect options for future undeveloped designation of this portion of the McKenzie Roadless Area.

Other Issues and Concerns

The following public concerns were considered but determined not to be significant issues. Some have been addressed through other processes or in the Forest Plan (see "Items Common to All Alternatives," in Chapter 2), or their resolution is beyond the scope of this project.

Changing Land Use Designations

Land use designations (LUD's) were assigned through the forest planning process and are not reassessed in this document, except for Old-growth Habitat. An interagency team of biologists analyzed the small old-growth reserve boundaries and has proposed changes to these boundaries in three VCU's, as described in Chapter 3. Land uses – in particular, near Saltery Cove, Clover Bay, and Sunny Cove – appear to be inconsistent with the current LUD of Timber Production. Alternatives and mitigation measures that are responsive to the significant issues will provide the decision maker with choices to maintain options for future LUD's.

Road Tie to the Rest of Prince of Wales Road System

Complex road design problems and their associated high costs make tying the Prince of Wales road system to the project area infeasible at this time. This is not part of the proposed action and will not be analyzed.

Make Sale Offerings to Small Businesses and Do Not Allow the Export of Spruce or Hemlock

The termination of the Long-term Sale Contract has opened all sales on the Tongass National Forest to independent bidders. Under some circumstances small sales are offered to very small operators only. We anticipate that a mix of sale sizes from this project area will be open to all bidders. The decision allowing the export of wood is made by the Regional Forester and is beyond the scope of this project.

Other resource concerns that were deemed important but not significant to the decision are covered in the analysis and briefly discussed in Chapter 3. The effects of harvest on these resources were either insignificant or could be mitigated through Forest Plan standards and guidelines. These resources are listed in the Other Environmental Considerations section of Chapter 3.

Federal and State Permits, Licenses, and Certifications

To proceed with timber harvest as addressed in this EIS, various permits must be obtained from federal and state agencies. The following permits would be obtained.

U.S. Army Corps of Engineers

- Approval of discharge of dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
- Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Environmental Protection Agency

- Storm water discharge permit.
- National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act).

State of Alaska, Department of Natural Resources

- Authorization for occupancy and use of tidelands and submerged lands.

State of Alaska, Department of Environmental Conservation

- Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).
- Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

U.S. Coast Guard

- Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed across navigable waters (within the tidal influence zone) of the United States.

Applicable Laws and Executive Orders

Shown below is a partial list of federal laws and executive orders pertaining to project-specific planning and environmental analysis on federal lands. While most pertain to all federal lands, some of the laws are specific to Alaska. Disclosures and findings required by these laws and orders are contained in Chapter 2 of this EIS.

- Multiple-Use Sustained-Yield Act of 1960
- National Historic Preservation Act of 1966 (as amended)
- Wild and Scenic Rivers Act of 1968, amended 1986
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Clean Air Act of 1970 (as amended)
- Alaska Native Claims Settlement Act (ANCSA) of 1971
- Marine Mammal Protection Act of 1972
- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)

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- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Alaska Native Interest Lands Conservation Act (ANILCA) of 1980
- Archeological Resource Protection Act of 1980
- Cave Resource Protection Act of 1988
- Tongass Timber Reform Act (TTRA) of 1990
- Magnuson-Stevens Fishery Conservation and Management Act of 1996
- Executive Order 11593 (cultural resources)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)

State of Alaska

In addition, the Coastal Zone Management Act (CZMA) of 1976, as amended, pertains to the preparation of an EIS. Federal lands are not included in the definition of the coastal zone as prescribed in the CZMA. However, the act requires that when federal agencies conduct activities or developments that affect the coastal zone, the activities or developments are consistent to the maximum extent practicable with the approved State Coastal Management Program. The Forest Service makes this determination.

The Alaska Coastal Management Plan incorporated the Alaska Forest Resources and Practices Act of 1979 (as amended) standards and guidelines for timber harvesting and processing. The Forest Service standards and guidelines and mitigation measures described in Chapters 2 and 3 of this document are comparable to or exceed state standards.

Chapter 2

Alternatives

2 Alternatives

project area could be harvested. The ID team combined logical groups of logging system settings from the LSTA into potential harvest units. These potential units were used to determine the volume available from the Cholmondeley Project Area. This preliminary unit pool included more than 8,550 acres. Additional analysis of the unit pool identified some units that would violate Forest Plan standards and guidelines if harvested. Others were identified that would be uneconomical to harvest even in good market conditions, and were deferred from harvest.

During the position statement process, the ID team chose to eliminate the area east of Swan Lake from further consideration because of difficult access and low-value timber stands. Access to this area from the north, through other ownerships, is unlikely. Although the State of Alaska has some timber in this area – mainly within the beach buffer – the ID team assumed they would plan little or no harvest. Sealaska Corporation considers it uneconomical to plan a LTF to the east of Sallery Cove, due to the poor quality and minor amount of timber available on their lands. Therefore, road access to the high- and medium-volume timber would have to be from the west after the selected lands northeast of Swan Lake are conveyed. A road from McKenzie Inlet would have to cross a large riparian area and stream south of Swan Lake. By eliminating timber harvest east of Swan Lake, potentially severe watershed impacts were avoided.

The Forest Service did not pursue underwater or above water surveys on potential LTF sites in this area due to the private upland ownerships. In addition, navigation charts indicate that the area between Giants Head and Skowl Point would be too shallow, rocky, and small to accommodate a LTF and rafting area.

Designating the area east of Swan Lake as an old-growth reserve (OGR) would provide connectivity between the beach fringe east of Sallery Cove and Skowl Arm and the alpine south of the lake. This combination of factors indicates that planning timber harvest east of Swan Lake is neither environmentally sound nor operationally acceptable.

Proposed Action

The ID team verified the preliminary timber diagnoses on each potential unit based on short- and long-term landscape or resource objectives (Chapter 1). The unit pool and the roads needed to access the units were then evaluated in the field. This unit pool was also used in the project's public scoping and identified as the Proposed Action. The original Proposed Action (Chapter 1) was modified slightly as a result of field analysis and is described in Alternative 5.

Potential harvest units were validated, modified, or deferred based on field investigations. For example, field investigations revealed that road construction to the LTF site between Skowl Point and Trollers Cove would be difficult because of numerous cliffs and scattered timber volume. The expense of building a road through this rugged terrain would not be recovered with the value of the timber volume. Modifications were also made to meet Forest Plan standards and guidelines. For instance, if an unknown stream or wetland was discovered during field reconnaissance, the appropriate forest-wide standards and guidelines (Riparian or Wetland) were applied. Some units were adjusted to have more logical boundaries, facilitate logging systems, or prevent isolating timber stands. All harvest prescriptions reflect Forest Plan standards and guidelines, incorporate field investigations and ID team analysis, and respond to public and interagency input.

The modifications described above led to the current harvest unit pool of 1,511 acres in 44 units. The proposed action and all action alternatives were developed from this

Alternative Development

potential pool. Site-specific descriptions and resource considerations for each potential harvest unit (unit cards) are included as Appendix B of this EIS. Proposed access methods (road cards) are described in Appendix C.

The modified Proposed Action (Alternative 5) is one of many possible approaches to harvesting timber in the project area. It was developed during the early planning phase of this project. The Proposed Action and alternatives to the proposed action are different responses to the significant issues of the project area. The alternatives represent site-specific proposals developed through the public involvement process by the ID team. For example, road construction in previously unroaded areas was a concern identified during scoping. ID team alternatives were formulated that do not require road construction. Alternatives address multiple issues where they are compatible. Each alternative is also designed to meet the stated purpose and need for the project and the project-specific desired future conditions. In some instances these concerns were addressed by deferring units from harvest. In other instances, the concerns have been, or would be, addressed during the design and implementation of the proposed activities (see "Items Common to all Alternatives" and "Mitigation"). High-resolution topographic maps, aerial photos, field reconnaissance information, and resource data available in geographic information system (GIS) format were used for unit evaluation and design.

Alternatives Considered but Eliminated from Detailed Study

Seven alternatives were considered during the planning process. Three alternatives were combined into one and are not included individually in the EIS for detailed study. These alternatives are briefly described in this section along with the reasons for not considering them further.

The communities in the project area expressed strong sentiment regarding timber harvest. Though their resource issues were generally the same, the communities are separated by distance and rugged terrain. The ID team initially considered three alternatives to specifically address each community's issues. However, since their issues were similar, we combined the alternatives into the community alternative (Alternative 3) and incorporated mitigation measures specific to each community. Analyzing these alternatives separately would not "sharply define the issues and provide a clear basis for choice." Five alternatives are considered in detail.

Items Common to All Alternatives

The analysis documented in this EIS discloses the effects that may occur from implementing the actions proposed in each alternative. Appropriate design and implementation can mitigate or prevent adverse impacts. ID team specialists processed field inventories, aerial photographs, and other digital data through GIS to analyze resource conditions and the effects of management on the project area. Resource concerns and methods to avoid or mitigate negative impacts are listed on harvest unit cards (Appendix B), road segment cards (Appendix C), or the mitigation table (Appendix D). These recommendations are then incorporated in the design of each unit or road segment. Resource concerns and mitigation measures may be refined

further during final layout. Key Forest Plan direction and design features of all the alternatives are listed below and address issues specific to this analysis.

Biodiversity, Old Growth, and Wildlife

The interdisciplinary team and the inter-agency biological team evaluated the old-growth reserves for size, spacing, habitat composition, and effectiveness (Chapter 3 page 3-36 to 3-38). They propose the following changes:

- Extend the northwest corner of the Sunny Cove old-growth reserve to the divide.
- Extend the north end of the Sallery Cove old-growth reserve to the encumbered land boundary. These changes were to correct mapping errors and do not appreciably benefit wildlife.
- Enhance connectivity between the medium old-growth reserve and the beach buffer east of Monie Lake by designating an old-growth reserve corridor around Monie Lake (Figure 3-9).

This proposal retains more high-value deer winter habitat and more effective wildlife corridors. These proposed changes would trigger a non-significant Forest Plan Amendment.

The boundary of Unit 616-012 would be relocated and the wetland buffer increased to prevent damage to Queen Charlotte Butterweed, a sensitive plant population.

The Forest Plan addresses the retention of snags and patches of trees in cutting units (Forest Plan, pages 4-98, 4-117, and 4-119). The silviculture prescriptions and planned logging systems leave buffers, residual trees, snags, and patches of trees in the cutting units. Through these methods, structural features important to marten and snag-dependent wildlife would be retained to varying degrees. In addition, these measures mitigate concerns about sedimentation of drinking water and wind velocity.

Repeated helicopter flights or flight corridors within 1/4 mile of active bald eagle nests shall be avoided (USDA 1990a).

Each alternative is designed to ensure well-distributed and viable wildlife populations by following the conservation strategy outlined in the Forest Plan (Forest Plan, pages 4-88 to 4-93). Each VCU in the project area contains at least a small old-growth reserve, as part of the forest-wide system of old-growth reserves. The old-growth reserves total approximately 23,750 acres of the project area.

Habitat for viable populations of all species potentially inhabiting the project area is maintained by following Forest Plan standards and guidelines. All action alternatives incorporate Forest Plan standards and guidelines for riparian areas, beach and estuary fringe, and marten. Road construction occurs in riparian management areas, beach, or estuary fringe habitats in Alternatives 3, 4, and 5. A minimum of 10 percent of the existing stand structure is retained in harvest units that contain high-value marten habitat for all VCU's (Forest Plan, page 4-119).

Fish and Marine Habitats

Landscape, watershed, and site-level conditions were assessed in the Cholmondeley watershed analysis. Riparian Management Area (RMA) boundaries were applied in all watersheds following process group guidelines (Forest Plan, pages 4-57 to 4-73). Some RMA boundaries exceed minimum requirements to address resource concerns. These are summarized below:

- Buffer widths were increased to 200-250 feet around Swan and Monie Lakes. No harvest would occur in these buffers to protect high quality, anadromous fish-rearing habitat, recreation use opportunities, and water quality.
- The no-cut buffer along the main stem of Sunny Creek was increased to 200-300 feet to address site-specific resource conditions. The wider buffer would have more wind resistance, provide for woody debris recruitment, and inhibit potential soil transport to the stream. These functions would preserve the integrity of the floodplain and maintain high quality fish habitat.
- The stream buffer on the south tributary of Monie Lake was increased to 200 feet. The wider buffer would protect the integrity of the floodplain and maintain high-quality fish habitat.
- Buffers extend to the slope breaks on all Class III streams. Leaving additional trees beyond the slope break is recommended on some streams for a "reasonable assurance of windfirmness." The width of this zone (varies 25-140 feet) is based on the risk to windthrow. The recommendations for windfirm zones are based on stream characteristics, existing blowdown patterns, and harvest unit configurations in relation to wind patterns.

Construction of a road south of Sunny Creek was eliminated from consideration. The ID team believed timber objectives could be met and the mariculture operation in Sunny Cove protected by not building this road. The integrity of the Old-growth Habitat LUD would also be preserved.

The Forest Plan standards and guidelines (Forest Plan, pages 4-8, 4-53) apply to all streams that support fish populations and Class III streams (not supporting fish populations) in the project area.

Harvest unit boundaries were designed to avoid detrimental impacts to water quality and fish habitat.

Up to three new log transfer facilities may be required to implement this project. These facilities would be located east of Sunny Cove, on the north side of Clover Bay, and on the northeast side of McKenzie Inlet. These sites were chosen after analyzing 22 possible sites (Appendix F). The types of facilities to use were also analyzed (Transportation Report, project file), and the chosen facilities were designed to address site-specific conditions and minimize potential marine impacts.

Heritage Resources

Areas considered as having a high probability of containing heritage resources (cultural sites) have been intensively surveyed by cultural resource specialists. All identified cultural sites have been avoided. All alternatives will be recommended for clearance from the Alaska State Historic Preservation Officer.

Karst

High vulnerability karst is removed from the suitable timber base (Forest Plan, page 4-19). All project activities avoid these areas and meet Forest Plan standards and guidelines for low and moderate vulnerability areas (Forest Plan, pages 4-18 to 4-20, Appendix I). Karst areas are noted on the unit cards (Appendix B) along with specific management requirements. Some requirements would be determined during unit layout if karst features are discovered. Management requirements include a minimum of partial log suspension. No roads or quarry development is planned within or adjacent to karst areas.

Scenery

Sale areas within priority travel route or use area viewsheds have been designed to meet the visual quality objectives of the Modified Landscape or Timber Production LUD's (Forest Plan, pages 4-75 thru 4-80). Harvest units, as designed in the alternatives, meet or exceed the required visual quality objective. Silvicultural and harvest strategies that achieve these visual quality objectives also mitigate concerns about increases in wind velocity or funneling. For instance, silvicultural systems that leave structure in the units and keep the canopy openings small decrease the potential for blowdown. Helicopter yarding precludes road construction, leaves fewer openings and more structure in the openings. These conditions also disrupt wind speed and direction.

Subsistence

All alternatives have been evaluated in compliance with ANILCA, Title VIII, Section 810.

Soils, Water Quality and Wetlands

Potential harvest units with slopes greater than 72 percent have received an on-site analysis of slope and Class IV channel stability, and an assessment of potential downstream effects (Floodplains, Soils and Wetlands Resource Report, project file). All of the isolated steep slopes that remain in harvest units can be harvested and not adversely affect soil, water quality, wetlands, and downstream resources. These areas have special provisions to mitigate the potential effects of harvest, including leave tree requirements and/or log suspension requirements during yarding. Only areas with a Mass Movement Index (MMI) less than MMI 4 are included in the unit pool.

Roads are located to minimize construction on slopes greater than 67 percent gradient and other unstable sites. All roads have been located to avoid and minimize effects on high value wetlands.

Additional mitigation measures were developed for activities upstream of domestic water users. These measures include:

- Increasing stream buffers on those streams used by the residents of Saltery and Sunny Coves.
- Storing petroleum products and refueling and maintenance of equipment outside of domestic use watersheds.
- Timing of road construction to avoid extremely wet periods.
- Proposing to cap water supply intakes during construction in the Sunny Cove watershed, if necessary.
- Developing rock pits outside of domestic use watersheds.
- Removing Unit 675-027 from harvest consideration to protect water quality in Sunny Cove.

Timber Harvesting and Transportation

The project area contains three areas of relatively concentrated suitable timber intermixed with areas of scattered low-volume timber. These areas of scattered low volume have marginal harvest economics and were deferred from consideration early in the planning process. Thus, the analysis in this EIS assumes that no future entries will be planned in the project area through the end of the rotation. The salvage of

windthrown timber or cedar products would be the only reasonably foreseeable harvest beyond the harvest planned in this EIS.

One or more of the following harvest systems are prescribed in all harvest units:

- modified clearcuts and other even-aged systems,
- two-aged harvest with reserves,
- uneven-aged harvest.

The windthrow risk was assessed for each unit. Harvest prescriptions incorporate methods and designs that reduce windthrow potential and wind effects at the anchorages.

Forest Plan standards and guidelines and Best Management Practices (BMP's) would be applied during road construction. These practices would reduce sedimentation and maintain channel integrity and fish passage. Special attention would be given to crossings on domestic water source streams (Appendix C) to address residents and lodge owners concerns regarding water quality in these areas.

Mitigation measures are incorporated in road design, location, and construction to protect soil, water, and fisheries resources (Appendix C). Timing of road construction to reduce potential impacts on incubating salmon eggs restricts the road construction window. The Craig Ranger District has been successful implementing the following BMP's on Class II streams and expanding the construction window on projects with timing restrictions:

- Installing temporary log stringer bridges allows equipment to cross a creek without any instream construction.
- Installing culverts or bridges during low flow periods or when streams are frozen minimizes impacts to the streams.

The district fisheries biologist is consulted on a case-by-case basis to determine appropriate options for each site.

The road management plan includes closing all temporary roads to motorized use immediately following completion of timber harvest activities. Drivable waterbars would be installed for the entire length of specified roads, and barriers would be constructed at the beginning of each road to prevent passenger vehicle use. Specified roads would be put in storage after timber salvage opportunities have been evaluated (3-4 years after harvest). Putting a road in storage requires removing all stream culverts, stabilizing unstable cut and fillslopes, constructing waterbars, and installing permanent barriers at the beginning of the road (Transportation Report, project file). These actions would mitigate concerns about noise, disturbance, and potential vandalism associated with motorized access as well as provide for resource protection.

Threatened, Endangered and Sensitive Species

The U.S Fish and Wildlife Service and the National Marine Fisheries Service concur with conclusions of the biological assessments for threatened or endangered species. A biological assessment was written for all threatened or endangered species potentially inhabiting the project area (Appendix E). We concluded no listed species nor its habitat would be adversely affected under any alternative when Forest Plan standards and guidelines are applied.

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Biological evaluations were completed for all sensitive species potentially inhabiting the project area (Appendix E). The Forest Plan standards and guidelines are applied for each sensitive species where habitat exists (Appendix B or C).

Alternatives Considered in Detail

The Proposed Action (Alternative 5) and four alternatives are considered in detail. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) require a "no action" alternative be analyzed in every EIS. This alternative represents the existing condition against which other alternatives are compared. Alternative 1 is the no-action alternative. Alternatives 2, 3, 4, and 5 represent different means of satisfying the purpose and need, by responding with different emphases to the significant issues discussed in Chapter 1.

Alternative 1 (No Action)

This alternative proposes no new timber harvest or road construction on the Cholmondeley Project Area. It does not preclude timber harvest from other areas or from the Cholmondeley Project Area in the future. The map of Alternative 1 (Figure 2-1) shows the current vegetation distribution, streams, roads, and other developments. Products and values currently supplied would continue unaltered.

Alternative 1 addresses the significant issues in the following ways:

Issue 1 - Effects on Saltery Cove -- Water quality of the streams that supply the community's drinking water would remain at natural levels. The local conditions that control water quality would be subject to natural forces and management of adjacent state and private land. Sportsman's Cove Lodge clients and local residents would continue to enjoy the scenery and solitude of Swan Lake and the community setting. They would not be affected by timber harvest and associated activities. The portion of Sportsman's Cove Lodge business that is dependent on the natural setting associated with Swan Lake and lands south of Saltery Cove would not be impacted by timber harvest activities. Security provided by the undeveloped lands south of the private lands would not change. Wind patterns, as influenced by timber stands to the south and west of Saltery Cove, would be subject to natural conditions only.

Issue 2 - Effects on Clover Bay -- Clover Bay Lodge clients would continue to experience the scenery and "wilderness experience," when fishing and viewing wildlife in Clarence Strait and Clover Bay. Their experience would not be disturbed by timber harvest, road construction, or a log transfer facility. The portion of Clover Bay Lodge business dependent on the natural setting would not be impacted by timber harvest activities. Water quality for Clover Bay Lodge would remain at its current level and subject to naturally occurring conditions.

Issue 3 - Effects on Sunny Cove -- Water quality of the stream that supplies the community's drinking water would remain at natural levels. The local conditions that control water quality would be subject to natural forces. Local residents would continue to experience the scenery and serenity of Sunny Cove. They would not be affected by timber harvest and associated activities. Hunting access, patterns of subsistence use, and private property security would be unchanged. Wind patterns potentially influenced by timber stands to the north and west of Sunny Cove would be subject to natural conditions only.

Issue 4 - Timber Sale Economics and Supply -- No timber volume would be produced from the Cholmondeley Project Area. Therefore no associated costs, revenues, or jobs would be generated.

Issue 5 - Roadless Character -- This portion of the McKenzie Roadless Area would remain unchanged. The roadless area would continue to offer primitive recreation opportunities over 90 percent of the area. Scenic values and opportunities for solitude would remain intact. Access to lakes and other points of interest on the project area would continue to be by floatplane or foot travel.

Alternative 2

No road or LTF construction is proposed in Alternative 2 to address the roadless character of the McKenzie Roadless Area. Alternative 2 also addresses concerns about security, domestic water quality, and wind patterns, as expressed by the residents and lodge owners in the project area. Helicopters would be used to yard timber from all harvest units. Helicopter yarding allows more trees to be left in the units than ground-based methods. Thus, the visual impacts of harvest are moderated.

Alternative 2 proposes to harvest 1,511 acres of commercial forest land in 44 harvest units (Figure 2-2). This proposed harvest would produce about 35.2 MMBF of timber. The average harvest unit size is 34 acres. The project area would be divided into five sale areas, the smallest of which would be about 5.1 MMBF.

Alternative 2 addresses the significant issues in the following ways:

Issue 1 - Effects on Saltery Cove -- Water quality in streams used for domestic water could be affected by blowdown of stream buffers left on the upper reaches of the two streams. The lack of road construction in this alternative keeps the risk of fine sediment inputs near natural conditions. Residents of Saltery Cove and visitors to Swan Lake are likely to see and hear helicopters and hear chainsaws during the season of logging operations. They are also likely to see log rafts in McKenzie Inlet, Skowl Arm, and Saltery Cove. Harvest of Units 614-002, 614-034a, and 614-034b would change the amount of tree cover on lands west and south of the lake. Lake users may observe parts of the backlines of Unit 614-002. The natural setting immediately around the recreation site near the lake would not be directly affected. The 200-foot buffer and partial cut between the buffer and the clearcut portion of the unit would block one's view of the clearcut. Residents and visitors to Saltery Cove may also observe relatively sharp contrasts in color and texture between the cut and uncut areas. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs (Social Economic Report, project file). General public access would remain similar to current access because no new road construction south and west of Saltery Cove would occur. There would be minimal change to the security of homes and businesses in Saltery Cove. Harvest of all units south and west of Saltery Cove could cause an increase of wind funneling that may affect residences in Saltery Cove (Chapter 3).

Issue 2 - Effects on Clover Bay -- Clover Bay Lodge clients may see and hear helicopters as they carry and drop logs in Clarence Strait or Clover Bay during the season of harvest operations. The backline of Unit 616-110 and a portion of harvested ground would be visible from the south side of the bay. Units 616-022, 616-023, and 616-123 are all visible to some extent from Clarence Strait. The wide stream buffers and reserve trees in these units temper the visual effects of timber harvest. The visual effects are within the thresholds set by the Visual Quality Objective (VQO) standards for the middle and foreground (Chapter 3). No LTF would be built in Clover Bay but lodge clients would see log barges, camp and support barges, and increased tug and

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boat activity. Clover Bay is the only safe moorage within a reasonable distance of the area. Logging support vessels may seek refuge in the bay, particularly at night or during storms. The Forest Service has no control over permitting activities that are not tied to the shoreline. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs. (Social Economic Report, project file). Water quality in the stream used by Clover Bay Lodge would likely remain at or near natural conditions.

Issue 3 - Effects on Sunny Cove -- Water quality in the Drinking Water watershed used by Sunny Cove residents would likely remain at or near natural conditions. Windthrow within this stream buffer is the only possible source of fine sediment. Water quality entering the domestic water intakes should be similar to natural conditions (Chapter 3, Issue 3, Domestic Water). Units 675-031 and 675-032 may be partially visible from the homes in Sunny Cove. The small unit size and number of trees left on the site would reduce the visual effects of harvest as seen from the homes. Residents may see and hear helicopters and chainsaws during the two seasons anticipated for logging operations. General public access would remain similar to current conditions because no roads would be built north of Sunny Cove. Thus, there would be little change in access to residents' homes. Harvesting Units 675-032, 674-032 and 675-031 may influence wind patterns in the cove. The unit size and shape, and trees left standing in the units should limit potential wind funneling. No change would be anticipated in the safety of the anchorage.

Issue 4 - Timber Sale Economics and Supply -- An estimated 35.2 MMBF of timber would be produced from the Cholmondeley Project Area. This volume would be divided into five sales with an average volume of 7.0 MMBF. This volume excludes incidental right-of-way volume and translates into approximately 186 timber jobs. The Present Net Value of this timber is estimated to be negative \$9,029,444 with a stumpage value of negative \$190 per MBF. This stumpage value estimate is from high market conditions. In low market conditions the stumpage has an estimated negative value of \$370 per MBF.

Issue 5 - Roadless Character -- Following timber harvest, 18,074 acres of the project area would remain classified as Primitive and 16,809 acres would classify as Semi-Primitive, Non-Motorized. These adjacent areas define the majority of the project area that maintains a natural, undeveloped character. The actual area without roading or timber harvest within the McKenzie Roadless Area would be reduced by approximately 9 percent. Changes in the scenic values and opportunities for solitude are described under issues 1, 2, and 3, above. The wildlife values are discussed in Chapter 3. The major area remaining as roadless is an unbroken parcel between Spiral Cove and Kluanil Cove. It includes the rugged terrain and lake basins in the center of the project area and the coastal area on the northern side of Cholmondeley Sound entrance (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

Alternative 3

Alternative 3 modifies timber harvest methods to mitigate concerns of the adjacent communities. It addresses concerns of domestic water quality, solitude and the natural setting, security, and wind patterns as expressed by the residents and lodge owners in the project area.

Alternative 3 proposes to harvest 1,489 acres of commercial forest land in 43 harvest units. This proposed harvest would produce about 33.4 MMBF of timber. The average harvest unit size is 35 acres. The project area would be divided into five sale areas, the

smallest of which would be about 5.1 MMBF. The units north of Clover Bay, south and west of SALTERY COVE, and west of Sunny Cove would be yarded by helicopters. One LTF would be constructed east of Sunny Cove in Cholmondeley Sound. Logs from the units north and east of Sunny Cove would be yarded by a combination of ground based equipment and helicopters. Ground-based equipment would require the construction of 4.6 miles of specified road. Unit 616-010, near Clover Bay, would not be harvested (Fig 2-3).

Issue 1- Effects on SALTERY COVE -- The prescriptions for Units 614-001a, 614-001b, 614-002, 614-034a, and 614-034b would retain more trees in the and create a tree density gradient from the uncut areas around lakes and streams to the clearcut openings. These prescriptions include wider buffers around lakes and streams than the other action alternatives (Appendix B).

No road construction would occur within the watersheds of the two streams used as drinking water sources. The logs from these units would be yarded using helicopters. Water quality in streams used for domestic water could be affected by blowdown of stream buffers left on the upper reaches of two streams. The lack of road construction in this alternative keeps the risk of fine sediment inputs near natural conditions.

Although portions of Units 614-001a and 614-001b would be visible from the mouth of SALTERY COVE, the density and distribution of trees left in these units would soften the visual impact on the natural landscape. Swan Lake visitors may observe parts of the backlines of Unit 614-002.

Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs (Social Economic Report, project file). In this alternative, hours of operation for helicopter yarding logs into SALTERY COVE would be limited between Memorial Day and the end of September from 7:00 am to 3:00 pm. This daily operational constraint will extend the period of helicopter logging. A contract "C" clause would be submitted to the Regional Office for approval to restrict helicopter operations in SALTERY COVE. Due to the economics of helicopter operations, the possibility exists that no purchaser will commit to a daily timing restraint. No timing restrictions would be placed on helicopter operations in McKenzie Inlet, or between September 30 and Memorial Day. Visitors to Swan Lake would likely see and hear helicopters and chainsaws during the 2-3 seasons of logging operations.

General public access would be similar to current conditions because no new road construction is proposed south and west of SALTERY COVE. Therefore, timber harvest activities would pose minimal risk to the security of residents and users of SALTERY COVE.

Though it is possible for local wind speeds to increase as a result of timber harvest, we do not anticipate any changes from natural conditions to result from harvest activities described in this alternative. Beach buffers of 1,000 feet should protect anchorages and facilities in SALTERY COVE. In addition, unit layout and size, and the trees left standing in the unit would mitigate potential wind funneling effects.

Issue 2 - Effects on Clover Bay -- Unit 616-010 would not be harvested, resulting in no visual effect from Clover Bay. Units 616-022, 616-023, and 616-123 are all visible from Clarence Strait to some extent. The wide stream buffers and reserve trees temper the visual effects of timber harvest. The visual effects would meet higher VQO standards than required for the middle and foreground. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation

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industry jobs (Social Economic Report, project file). Helicopter operations in Clover Bay would be restricted between June 1 and August 15. A contract "C" clause would be submitted to the Regional Office for approval to restrict helicopter operations in the bay. Helicopter flight paths would also be restricted over eagle nests in Clover Bay. Clover Bay Lodge clients may hear helicopters and see log drops in Clarence Strait during the 1-2 seasons of logging operations. No roads or LTF would be built, so the lodge clients would not view any construction or log rafts in Clover Bay. Water quality in the stream used for drinking water by Clover Bay Lodge would remain subject to natural conditions since Unit 616-010 would not be harvested.

Issue 3 - Effects on Sunny Cove -- Water quality in the Drinking Water Watershed used by Sunny Cove residents could be adversely affected by fine sediment generated from road construction and log haul and by potential blowdown of one stream buffer. The quality of water entering the intakes would be comparable to that resulting from natural bank erosion when mitigation listed on the road cards is implemented.

The small unit size and number of reserve trees left on the harvest units would decrease the visual effects of harvest as seen from homes in Sunny Cove. Residents would see and hear logging activity during the 2-4 seasons of operations.

To access units north of Sunny Cove, 4.6 miles of specified road construction and one LTF would be constructed (Figure 2-3). The roads would be open to all uses except motorized vehicles for about three years. It would be placed in storage following silvicultural evaluation of the harvest units and potential salvage. There may be an increase in hiking use on the Forest road, but since the road is located more than 1/4 mile from private homes, we expect minimal changes in the security of the area.

Harvest of Units 675-032, 674-032, and 675-031 may influence wind patterns in the cove. The small unit size and trees left standing on the units should break the wind and prevent funneling. Beach buffers of 1,000 feet should protect anchorage and facilities in Sunny Cove.

Issue 4 - Timber Sale Economics and Supply -- An estimated 33.4 MMBF of timber would be produced from the Cholmondeley Project Area. This volume would be divided into five sales with an average volume of 6.7 MMBF. This volume excludes incidental right-of-way volume and translates into approximately 176 timber jobs. The Present Net Value of this timber is estimated to be negative \$5,651,706 with a stumpage value of negative \$100 per MBF. This stumpage value estimate is from high market conditions. In low market conditions the stumpage has an estimated negative value of \$280 per MBF.

Issue 5 - Roadless Character -- Following timber harvest, 18,074 acres of the project area would remain classified as Primitive and 16,809 acres would be classified as Semi-Primitive, Non-Motorized. Therefore, approximately 2/3 of the project area maintains a natural, undeveloped character. The actual area without roading or timber harvest within the entire McKenzie Roadless Area would be reduced by about 8 percent. Changes in the scenic values and opportunities for solitude are described under issues 1, 2, and 3, above. The wildlife values are discussed in Chapter 3. The area remaining as roadless is an unbroken parcel between Spiral Cove and Kluanil Cove. It includes the rugged terrain and lake basins in the center of the project area and the coastal area on the northern side of Cholmondeley Sound entrance. Access to lakes and inland points of interest would be similar to current conditions except in Sunny Cove. The road north of Sunny Cove would provide a foot trail through the

Drinking Water Watershed and lower part of the Sunny Creek Watershed. Temporary disturbance from the logging operations would last from 3 to 5 years (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

Alternative 4

Alternative 4 emphasizes timber harvest and developing sale packages with the highest economic benefits.

Alternative 4 proposes to harvest 941 acres of commercial forest land in 26 harvest units. This proposed harvest would produce about 23.4 MMBF of timber. The average harvest unit size is 36 acres. The project area would be divided into three sale areas, the smallest of which would be about 7.6 MMBF. Most of the units would be yarded using ground-based equipment. This would necessitate the building of 14.9 miles of specified road and three LTF's. The LTF's would be built in McKenzie Inlet, the mouth of Clover Bay, and east of Sunny Cove in Cholmondeley Sound. Units along West Arm of Cholmondeley Sound and north of Monie Lake would be deferred from harvest (Figure 2-4).

Issue 1- Effects on Saltery Cove -- The harvest prescriptions for Units 614-001a, 614-001b, 614-002, 614-034a, and 614-034b at Saltery Cove are similar to Alternative 2, except fewer trees would be left standing in the units. These prescriptions include buffers around lakes and streams, and 'no-cut' areas adjacent to domestic water streams. Road construction and log haul would likely generate fine sediment in two streams used for drinking water by residents of Saltery Cove. Water turbidity would be monitored to ensure compliance with Alaska state water quality standards.

Residents and visitors of Saltery Cove and Swan Lake are likely to see and hear logging activity during the 2 to 4 seasons of operations. As in Alternative 2, visitors and residents will see two small, distinct clearcut areas on the slopes behind the residences and lodge (Figure 3-4). Swan Lake visitors may observe parts of the backline of Unit 614-002. Cable logging systems would remove more trees from the units than helicopter logging and the units would be more visible. Visitors to Swan Lake would see fill slopes along portions of the road. Based on information provided by the lodge owners, they would anticipate a moderate risk of losing recreation industry jobs. (Social Economic Report, project file).

To access the harvest units south of Saltery Cove, 4.2 miles of specified road and one LTF would be constructed (Figure 2-4). The roads would be closed to motorized use following silvicultural evaluation of the harvest units and potential salvage. Hiking and hunting use on the roads may increase.

We expect the distance between the harvest units and Saltery Cove would be enough to negate any possible wind effects reaching the cove. The unit layout and size, and tree cover remaining should break windspeed. The forested private or state lands surrounding the cove should protect anchorages and facilities in Saltery Cove. We would not anticipate increased safety risks to the homes, lodge or anchorage (Silviculture and Timber Resource Report, project file).

Issue 2 - Effects on Clover Bay -- Units north of Monie Lake would not be harvested under this alternative, so very few changes to the landscape would be visible from Clarence Strait. The backline of Unit 616-010 and a portion of harvested ground would be visible from the south side of Clover Bay. The visual effects would be well within the VQO standards for the middle and foreground. Clover Bay Lodge clients would see and hear logging activity during the 2-3 seasons of harvest operations.

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Six miles of specified road would be constructed to access the harvest units in Clover Bay (Figure 2-4). The roads would remain open to all uses except passenger vehicles. An LTF would be constructed in Clover Bay under this alternative. The LTF would alter the recreation setting in Clover Bay. Based on information provided by the lodge owners, they would anticipate a high risk of losing recreation industry jobs (Social Economic Report, project file).

Water quality in the stream used for domestic water should remain similar to current conditions. A buffer of trees would be left adjacent to the stream. A short road segment would be constructed in this watershed. However, given the location of the road and gentle slopes, sediment production should be minimal. Road construction can be timed to avoid the seasonal use of the stream.

Issue 3 - Effects on Sunny Cove -- Water quality in the Drinking Water Watershed, used by Sunny Cove residents, could be adversely affected by fine sediment generated from road construction and log haul and by potential blowdown of one stream buffer. The quality of water entering the intakes would be comparable to that resulting from natural bank erosion when mitigation listed on the road cards is implemented.

The small size and reserve trees left in the harvest units would decrease the visual effects of harvest as seen from homes in Sunny Cove. Residents would see and hear logging activity during the 2-4 seasons of operations. To access the harvest units north of Sunny Cove, 4.6 miles of specified road and one LTF would be constructed. The road would be open to all uses except motorized use for three years. It would be put in storage following silvicultural evaluation of the harvest units and salvage of potential blowdown. Hiking use may increase on the Forest road but since the road would be located more than ¼ mile from private homes, we expect minimal changes in the security of the area.

Harvest of Units 675-032, 674-032, and 675-031 may influence wind patterns in the cove. The small unit size and trees left standing on the units should break the wind and prevent funneling. Beach buffers of 1,000 feet are designed to protect anchorages and facilities in Sunny Cove. No change would be anticipated to the safety of the anchorage.

Issue 4 - Timber Sale Economics and Supply – An estimated 23.4 MMBF of timber would be produced from the Cholmondeley Project Area. This volume would be divided into three sales with an average volume of 7.8 MMBF. This volume excludes incidental right-of-way volume and translates into approximately 124 timber jobs. The Present Net Value of this timber is estimated to be \$4,146,726 with a stumpage value of \$240 per MBF. This stumpage value estimate is from high market conditions. In low market conditions the stumpage has an estimated value of \$60 per MBF.

Issue 5 - Roadless Character – Following timber harvest, 26,404 acres of the project area would remain classified as Primitive and 14,415 acres would classify as Semi-Primitive, Non-Motorized. Therefore, the majority of the project area maintains a natural, undeveloped character. The actual area without roads or timber harvest within the McKenzie Roadless Area would be reduced by approximately 5 percent. Changes in the scenic values and opportunities for solitude are described under Issues 1, 2, and 3, above. The wildlife values are discussed in Chapter 3. The area remaining as roadless would include the broad coastal area from Kluanil Cove to south of Island Point, across the rugged terrain and lake basins of the central part of the project area,

to the northern side of Cholmondeley Sound entrance. New access points to lakes and inland points of interest would be available at McKenzie Inlet, Clover Bay, and Sunny Cove. Temporary disturbance from the logging operations would last between 3-5 years (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

Alternative 5 (Preferred)

Alternative 5 is the proposed action and preferred alternative in this draft EIS. This alternative emphasizes timber harvest to most closely meet outputs anticipated in the Forest Plan. All timber units available at this time are proposed for harvest. The most economically feasible silvicultural prescriptions and logging systems that address resource concerns are planned. Forest Plan standards and guidelines are implemented to meet required resource protection.

Alternative 5 proposes to harvest 1,511 acres of commercial forest land in 44 harvest units. This proposed harvest would produce about 35.2 MMBF of timber (Figure 2-5). The average harvest unit size is 34 acres. The project area would be divided into five sale areas, the smallest of which would be about 5.1 MMBF. Most of the units would be yarded using ground-based equipment. This would require constructing 22.3 miles of specified road and 3 LTF's. The LTF's would be built in McKenzie Inlet, the mouth of Clover Bay, and east of Sunny Cove in Cholmondeley Sound.

Issue 1- Effects on SALTERY COVE -- The harvest prescriptions for Units 614-001a, 614-001b, 614-002, 614-034a and 614-034b at SALTERY COVE are similar to Alternative 2, except fewer trees would be left standing in the units. These prescriptions include buffers around lakes and streams, and 'no-cut' areas adjacent to domestic water streams. Road construction and log haul would likely generate fine sediment in the two streams used for domestic water. The amount of fine sediment is dependent on the road approaches to the streams, rock durability, amount of rainfall during haul, and the amount of traffic. Water turbidity would be monitored to ensure compliance with Alaska state water quality standards. Residents of SALTERY COVE will monitor water quality in domestic water supply streams and notify the Forest Service if water quality deteriorates. The Forest Service will take action to insure unacceptable conditions are fixed.

Residents and visitors of SALTERY COVE and Swan Lake are likely to see and hear logging activity in the distance during the 2-4 seasons of operations. Visitors and residents of SALTERY COVE would see two small, distinct harvest areas on the slopes behind the residences and lodge from the cove (Figure 3-4). Swan Lake visitors may observe parts of the backline of Unit 614-002. Based on information provided by the lodge owners, they would anticipate a moderate risk of losing recreation industry jobs (Social Economic Report, project file).

To access the harvest units south of SALTERY COVE, 4.3 miles of specified road would be constructed. The roads would be closed to motorized use following harvest. Hiking and hunting use on the roads may increase. We do not anticipate increased safety risks to the homes or lodge (Silviculture and Timber Resource Report, project file).

We expect the distance between the harvest units and SALTERY COVE would be enough to negate any possible wind effects reaching the cove. The unit layout and size, and tree cover remaining should break wind speed. The forested private or state lands surrounding the cove should protect anchorages and facilities in SALTERY COVE. We do not anticipate increased safety risks to the anchorage (Silviculture and Timber Resource Report, project file).

Issue 2 - Effects on Clover Bay -- The backline of Unit 616-010 and a portion of harvested ground would be visible from the south side of Clover Bay. Units 616-022, 616-023, and 616-123 are all visible from Clarence Strait to some extent. The wide stream buffers and reserve trees would temper the visual effects of timber harvest. The visual effects of timber harvest would be well within the VQO standards of the middle and foreground. Clover Bay Lodge clients would see and hear logging activity during the 2-4 seasons of harvest operations. The scenery would be modified as seen from Clarence Strait.

Changes to the landscape, as seen from Clover Bay, would be slight except for the LTF, which would alter the recreation setting. Based on information provided by the lodge owners, they would anticipate a high risk of losing recreation industry jobs (Social Economic Report, project file).

Access to the harvest units north of Clover Bay requires constructing 13.5 miles of specified road. The road from Clover Bay to Monie Lake would remain open to all uses except passenger vehicles. The road north of Monie Lake and all temporary roads would be closed to motorized use. Closed roads would be put in storage after evaluation of silvicultural objectives and potential salvage of blowdown.

Water quality in the stream would remain similar to current conditions.

Issue 3 - Effects on Sunny Cove -- Water quality in the Drinking Water Watershed used by Sunny Cove residents could be adversely affected by fine sediment generated from road construction and log haul and by potential blowdown of one stream buffer. Windthrow within this buffer would be a possible source of fine sediment. Water quality entering the intakes would be comparable to that resulting from natural bank erosion when mitigation listed on the road cards is implemented.

The small unit size and number of reserve trees left in the harvest units would decrease the visual effects of timber harvest as seen from homes in Sunny Cove. Residents would see and hear logging activity during the 3-4 seasons of operations.

Access to the harvest units north of Sunny Cove requires the construction of 4.6 miles of specified road and one LTF (Figure 2-5). The road would be open to all uses except motorized use for about three years after harvest. It would be put in storage following silvicultural evaluation of the harvest units and potential salvage of blowdown. Hiking use may increase on the Forest road but since the road is located more than ¼ mile from private homes, we expect minimal changes in the security of the area.

Harvest of Units 675-032, 674-032, and 675-031 may influence wind patterns in the cove. The small unit size and trees left standing on the units should break windspeed. Beach buffers of 1,000 feet should protect anchorages and facilities in Sunny Cove. We expect no effect to the safety of the anchorage (Silviculture and Timber Resource Report, project file).

Issue 4 - Timber Sale Economics and Supply -- An estimated 35.2 MMBF of timber would be produced from the Cholmondeley Project Area. This volume would be divided into five sales with an average volume of 7.0 MMBF. This volume excludes incidental right-of-way volume and translates into approximately 186 timber jobs. The Present Net Value of this timber is estimated to be \$5,036,556 with a stumpage value of \$210 per MBF. This stumpage value estimate is from high market conditions. In low market conditions the stumpage has an estimated value of \$20 per MBF.

Issue 5 - Roadless Character -- Following timber harvest, 18,074 acres of the project area would remain classified as Primitive and 16,809 acres would classify as Semi-Primitive, Non-Motorized. Therefore, the majority of the project area maintains a natural, undeveloped character. The actual area without roads or timber harvest within the McKenzie Roadless Area would be reduced approximately by 9 percent. Changes in the scenic values and opportunities for solitude are described under Issues 1, 2, and 3, above. The wildlife values are discussed in Chapter 3. The large area remaining as roadless is an unbroken parcel of land between Spiral Cove and Kluaniil Cove. It includes the rugged terrain and lake basins in the center of the project area and the coastal area on the northern side of Cholmondeley Sound entrance. New access points to lakes and inland points of interest would be available at McKenzie Inlet, Clover Bay, and Sunny Cove. The road north of Sunny Cove would provide a convenient trail through the Drinking Water Watershed and lower part of the Sunny Creek Watershed (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file). Temporary disturbance from the logging operations would last between 3-5 years.

Comparison of Alternatives

This section compares objectives, outputs, and effects of the alternatives for the significant issues and resource concerns of the Cholmondeley Project. This information provides an overview comparison of the alternatives and is summarized from the effects discussions in Chapter 3.

Table 2-1: Comparison of Alternatives

CATEGORY	Units	Alternatives				
		1	2	3	4	5
Undeveloped Character						
Average size of units	Acres	0	34	35	36	34
Total harvest	Acres	0	1511	1489	941	1511
New log transfer facilities (LTF's)	Each	0	0	1	3	3
Existing productive old growth remaining	Percent	100	91	92	95	91
ROS class Primitive (P) in project area	Percent	90.1	35.3	35.3	51.5	35.3
ROS class Semi-Primitive Non-Motorized (SPNM) in project area	Percent	8.9	32.8	32.8	28.1	32.8
Recreation sites with change in ROS (Total =27)	Number	0	15	11	10	15
High Concern Watersheds With Activities	Number	0	4	3	2	4
Watersheds with activities (out of 53 in the project area)	Number	0	24	19	16	24
Visual Quality Objective response on:*						
West Arm Cholmondeley Sound	Meets VQO	exc.	meet	meet	exc.	meet
Sunny Cove	Meets VQO	exc.	exc.	meet	exc.	meet
Doctor Point	Meets VQO	exc.	meet	meet	meet	meet
Clover Bay	Meets VQO	exc.	exc.	exc.	meet	meet
Trollers Cove	Meets VQO	exc.	exc.	exc.	exc.	exc.
Saltery Cove	Meets VQO	exc.	exc.	exc.	exc.	exc.
Domestic Water Supply						
Stream crossings in domestic watersheds	Each	0	0	4	6	6
Open roads in domestic watershed after salvage	Miles	0	0	0	0	0
Stream Crossings						
Saltery	Each	0	0	0	3	3
Clover	Each	0	0	0	0	0
Sunny	Each	0	0	4	4	4

Table 2-1: Comparison of Alternatives (continued)

CATEGORY	Units	1	2	3	4	5
Alternatives						
Domestic Water Supply(continued)						
Buffer Width on domestic watershed streams						
Saltery	Feet	n/a	250	500	250	250
Clover	Feet	n/a	100	n/a	100	100
Sunny (Drinking Water Creek)	Feet	n/a	100	100	100	100
Greatest Tree Retention in harvest units, 1=highest						
Saltery	Ranking	1	3	2	4	4
Clover	Ranking	1	3	2	4	4
Sunny	Ranking	1	2	3	3	3
Wind						
Two-aged with Reserves	Acres	0	122	388	122	122
Unharvested Productive old-growth acres remaining	M Acres	18.1	16.6	16.6	17.2	16.6
Acres with high risk to windthrow	Percent	0	40	34	50	40
Safety						
Specified road construction	Miles	0	0	4.6	14.9	22.3
Distance to Closest Open Road During Harvest Operations						
Saltery Cove	Miles	n/a	n/a	n/a	.4	.4
Clover Bay	Miles	n/a	n/a	n/a	.4	.4
Sunny Cove	Miles	n/a	n/a	.3	.3	.3
Open roads after salvage	Miles	0	0	0	6	6
Subsistence						
High and moderate use subsistence (TRUCS), harvested	Acres	0	0	0	0	0
Significant restrictions to access	Response	none	none	none	none	none
Deer habitat capability affected	Ranking	none	most	mod.	least	most
Significant Possibility of a Significant Restriction						
Deer	Response	no	no	no	no	no
Bear	Response	no	no	no	no	no
Furbearers	Response	no	no	no	no	no
Salmon	Response	no	no	no	no	no
Other Finfish	Response	no	no	no	no	no
Waterfowl	Response	no	no	no	no	no
Marine Mammals	Response	no	no	no	no	no
Indirect and cumulative effects on subsistence of implementing the Forest Plan over entire rotation	Response	none	none	none	none	none
Economics (Timber) (does not include ROW)						
Estimated Net stumpage (low-market rates)	\$ / MBF	0	-370	-280	60	20
Estimated Net stumpage (high-market rates)	\$ / MBF	0	-190	-100	240	210
Estimated Present Net Value	\$ MM	0	-9.0	-5.7	4.1	5.0
Total jobs in logging	# of jobs	0	186	176	124	186
Total income generated in logging industry	\$MM	0	8.78	8.4	6.16	9.3
Non-Interchangeable Component II						
Saltery	Percent	72	62	62	62	62
Clover	Percent	54	28	27	15	28
Sunny	Percent	67	60	60	69	60
Timber offerings (sales) anticipated	Each	0	5	5	3	5
Potential Impact to recreational work force (1=most)	Ranking	5	3	4	2	1
High cost yarding techniques (skyline & helicopter)	Acres	0	1511	1415	396	859
Average cost yarding techniques (cable and shovel)	Acres	0	0	74	545	652
Suitable acres harvested	Percent	0	24	23	15	24
Volume per mile of new road	MMBF	0	-	7.7	1.6	1.6
Volume offered (no ROW included)	MMBF	0	35.2	33.4	23.4	35.2

Table 2-1: Comparison of Alternatives (continued)

CATEGORY	Units	Alternatives				
		1	2	3	4	5
Roadless						
Roadless Area Remaining	M Acres	79.3	73.1	73.0	75.2	72.5
Effects on Solitude/pristine values (1=most)	Ranking	5	3	2	4	1
New log transfer facilities (LTF's)	Each	0	0	1	3	3
Changes from Natural ROS settings at Key access points- (resulting ROS class in areas listed below)**						
Swan Lake		r/ spnm	r/rm	r/rm	r/rm	r/rm
Saltery Cove		r/ spnm	r/rm	r/rm	r/rm	r/rm
Spiral Cove		p	p	p	p	p
Trollers Cove		p	rm/ spnm	rm/ spnm	p	rm/ spnm
Monie Lake		p	rm	rm	rm/ spnm	rm
Clover Bay		p	rm/ spnm	rm/ spnm	rm/ spnm	rm/ spnm
Sunny Cove		r/ spnm	r/rm	r/rm	r/rm/ spnm	r/rm

*exc. = exceeds – meets a standard higher than required in the Forest Plan.

**p=primitive; spnm=semi-primitive, non-motorized; rm=roaded modified; r=rural;

Mitigation

The analysis documented in this EIS discloses possible adverse impacts that may occur from implementing actions proposed under each alternative. Measures have been formulated to mitigate or reduce these impacts. These measures were guided by the direction from the Forest Plan previously described in this chapter and in Chapter 1.

ID team specialists use on-the-ground inventories, computer (GIS) data, and aerial photographs to prepare the unit cards for each harvest unit in the unit pool for the project. Cards are also prepared for each segment of road. Resource specialists include their concerns on the cards and then describe how the concerns can be mitigated (if not completely avoided) in the design of each unit and road segment. These cards may be found in Appendices B and C. Resource concerns and mitigation measures may be refined further during final layout, when specialists have one more opportunity to revise their unit and road card recommendations.

Applicable Forest Plan standards and guidelines, Best Management Practices (BMP's) used to meet the requirements of the Clean Water Act, and project-specific mitigation measures are identified on the harvest unit and road cards. Appendix D includes a complete list of the project-specific measures, and a table linking each measure to the applicable harvest units and road segments.

Monitoring

Monitoring activities are divided into three broad categories: Forest Plan monitoring, routine implementation monitoring, and project-specific monitoring. The National Forest Management Act requires national forests to monitor and evaluate their forest plans (36 CFR 219.11). Chapter 6 of the Forest Plan includes monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three levels of Forest Plan monitoring:

Implementation monitoring is used to determine whether the goals, objectives, standards and guidelines and management prescriptions are implemented as detailed in the Forest Plan.

Effectiveness monitoring is used to determine whether the standards and guidelines and management prescriptions, as designed and implemented, effectively meet the Forest Plan goals and objectives.

Validation monitoring is used to determine whether the data, assumptions, and estimated effects used to develop the Forest Plan are correct.

These levels of monitoring provide information about the effectiveness of mitigation measures or management practices. An interagency team, composed of administrative and resource specialists, field reviews a subsample of timber harvest units across the Tongass National Forest. Units from the Cholmondeley Project would be included in this review. The team assesses which standards and guidelines were executed and how well. Their results are summarized in Tongass National Forest Annual Monitoring and Evaluation Reports. This report references all monitoring conducted on the Forest and assesses progress toward achieving the goals and objectives of the Forest Plan. The team certifies whether the Forest Plan is sufficient to guide management of the Tongass National Forest over the next year. They propose any changes needed to achieve the goals and objectives and an approach for making those changes.

Forest Plan Effectiveness Monitoring

The Tongass National Forest monitors populations and habitat for resident fish management indicator species on several sites across the Forest. One site is located on Drinking Water Creek in the Cholmondeley Project Area. Dolly Varden and cutthroat trout populations have been estimated and their habitat surveyed annually since 1999. Annual monitoring will continue on these stream reaches through timber harvest operations, and any changes in populations will be noted.

The Forest Service installed channel condition assessment sites in Monie and Saltery Creeks in 1996 and 1997, respectively. Detailed data from stream cross-sections and longitudinal profiles are collected during channel condition assessments to monitor changes of the channel. The monitoring site in Monie Creek is located in the western tributary upstream of Monie Lake. The site in Saltery Creek is approximately one-quarter mile upstream of Saltery Lake. Each of these sites will be monitored at least once prior to the start of logging activities above the sites. These sites will also be monitored periodically for one to two years following logging to identify changes in channel sediment regimes and changes in fish habitat.

Routine Implementation Monitoring

Routine implementation monitoring assesses whether the project was completed as designed and whether it complies with the Forest Plan. Planning for routine implementation monitoring begins with the preliminary design of harvest units and roads. Mitigation methods and prescriptions listed on the unit and road cards (Appendices B and C) are the basis for determining if recommendations were executed during the Cholmondeley Project.

Routine implementation monitoring is part of the administrative record of a timber sale. Unit and road card directions from this planning process are carried through project layout and translated into the timber sale contract. Timber sale administrators and engineering inspectors monitor and enforce contract compliance. Resource specialists, such as fisheries biologists, soil scientists, and hydrologists are regularly requested to provide technical advice during this process. Due to the importance of the domestic water supplies, special care would be taken to monitor turbidity during road construction and log haul.

Project-Specific Monitoring

Project-specific monitoring assesses how well the project design and mitigation measures protect natural resources and their beneficial uses. Project-specific monitoring related to the significant issues follows.

Domestic Water Quality

Objective/action: Maintain water quality in domestic water supply streams.

Method: When on-site, contract administrators would visually monitor suspended sediment, bedload, and any other inputs to domestic water supply streams. If turbid water is noted, activities would be halted and corrective actions taken. The Forest Service would inform residents when instream activities would occur. If water quality problems arise in those locations, they would notify the Forest Service so corrective actions can be taken.

Wind Pattern Changes In Reserve Tree Units

Objective/action: Determine whether reserve trees stand over time and verify assumptions about wind patterns and speed.

Method: Monitor units adjacent to Drinking Water Watershed for buffer effectiveness. Determine if salvage should occur before planned road closure.

Commercial Lodge Use

Objective/action: Monitor visitor use levels with the lodges to measure any shifts in clientele.

Method: Work with lodge owners/managers for annual use reviews after project is implemented.

Recreation

Objective/action: Determine changes in the type and amount of recreation use occurring near the Saltery and Sunny Cove residences and Sportsman Cove Lodge and if it is associated with the road systems.

Method: Cooperate with residents and the lodge owners to periodically observe and record use of the road systems by these various user groups. Collect data on the impact this use has on the area setting.

2 Alternatives

Scenery Resources

Objective/action: Determine how well harvest methods other than clearcuts meet the desired visual objectives.

Method: Observe and document the visual effects of harvest methods other than clearcuts from the same viewpoints as described in the EIS. Compare the predicted and actual visual quality of the harvest treatments and how well they meet the visual quality objectives.

Findings and Disclosures

Several laws and executive orders listed in Chapter 1 require project-specific findings or other disclosures. These are included here, and also in the Record of Decision. They apply to all alternatives considered in detail in this EIS.

National Forest Management Act

The Cholmondeley Project implements Forest Plan goals and objectives (Forest Plan, pages 2-3 thru 2-5). All project alternatives comply with the Tongass Forest Plan and the Alaska Regional Guide. They incorporate all applicable forest-wide standards and guidelines and LUD management prescriptions. All required interagency review and coordination has been accomplished; new or revised measures resulting from this review have been incorporated.

The Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14-219.27). Application of Forest Plan direction for the Cholmondeley Project ensures compliance with NFMA at the project level. Specific NFMA findings pertaining to silvicultural systems are included in Chapter 3 and the project planning record.

Endangered Species Act

None of the alternatives would have a direct, indirect or cumulative effect on any threatened or endangered species in the project area. The Forest Service consulted with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. These agencies concurred that the proposed project is not likely to affect any threatened or endangered species. A complete biological assessment is included in the planning record.

Tongass Timber Reform Act

Application of Forest Plan Riparian standards and guidelines ensures that no commercial timber harvest would occur within 100 feet of any Class I stream or any Class II stream flowing directly into a Class I stream.

National Historic Preservation Act

The Forest Service Prince of Wales zone archaeologist conducted an analysis of potential effects on cultural resources, which included a review of previous archaeological investigations in the project area and descriptions of previously recorded sites. High sensitivity areas were selected for field surveys conducted in 1997. All identified historic properties have been avoided (Forest Plan, page 4-15). A recommendation of no effect on cultural resources for all alternatives has been made. It will be submitted to the State Historic Preservation Officer (SHPO) for concurrence prior to signing the Cholmondeley ROD. The National Historic Preservation Act was

amended in 1999 to require consultation with affected tribes and Native organizations as part of the SHPO consultation process. The additional consultation is used to determine eligibility for the National Register of recorded historic properties. This additional consultation is currently being conducted.

Federal Cave Resource Protection Act

No known significant caves in the project area would be directly or indirectly affected by project activities. Forest Plan karst and cave standards and guidelines are applied to areas known or suspected to contain karst resources.

Alaska National Interest Lands Conservation Act (ANILCA)

An ANILCA Section 810 subsistence evaluation was conducted. Preliminary findings indicate that the direct effects, potentially foreseeable, and cumulative effects from the alternatives in this project do not present a significant possibility of a significant restriction of subsistence uses of deer, black bear, marten, wolf, otter, marine mammals, waterfowl, salmon, other finfish, shellfish, and other foods. One or more public hearings will be held in the vicinity of the project area (Subsistence Resource Report, project file).

Clean Water Act

The design of harvest units and roads is in accordance with Forest Plan standards and guidelines, the Alaska Regional Guide, Best Management Practices (BMP's), and applicable Forest Service manual and handbook direction. The harvest unit and road cards for the Cholmondeley Project (Appendices B and C) include specific requirements prescribed to prevent or reduce non-point sediment sources. Monitoring and evaluation of the implementation and effectiveness of Forest Plan standards and guidelines and BMP's would occur. Project activities are expected to meet all applicable State of Alaska water quality standards.

State regulations provide for variances from anti-degradation requirements and water quality criteria. Logging and road building operators are responsible for compliance, including obtaining variances required by the State. The Forest Service monitors compliance. Timber harvest activities are expected to qualify for any variances in accordance with the Alaska State Code, 18 AAC 70.015.

All roads, landings and rock pits would be designed and constructed in accordance with the applicable BMP's listed at 33 CFR 323.4(a). No permits under Section 404 of the Clean Water Act would be required.

Clean Air Act

Emissions anticipated from the implementation of any project alternative would be of short duration and are not expected to exceed State of Alaska ambient air quality standards (18 AAC 50).

Coastal Zone Management Act

Forest Plan standards and guidelines applicable to the timber harvest activities of the Cholmondeley Project meet or exceed the requirements of the State of Alaska Forest Practices Act. The State of Alaska Office of Governmental Coordination would conduct a consistency review of the project with the Coastal Zone Management Act.

2 Alternatives

Executive Order 11988 - Floodplains

The numerous streams in the project area make it essentially impossible to avoid all floodplains during timber harvest and road construction. Forest Plan standards and guidelines for riparian areas exclude most commercial timber harvesting from floodplains. Roads may be constructed across floodplains subject to design requirements of BMP's (FSH 2509.22). Effects on floodplains from project activities have been avoided or minimized as much as possible.

Executive Order 11990 - Wetlands

It is not feasible to avoid all wetland areas in the project area because wetlands are so extensive. Wetland soils not meeting Forest Plan criteria for timber harvest suitability are excluded from the harvest base. Soil moisture regimes and vegetation on some wetlands may be altered in some harvest units. The affected wetlands would still function as wetlands in the ecosystem and meet the wetland classification. Road construction through wetlands is avoided where possible. Effects to wetlands are minimized through the application of specific BMP's.

Executive Order 12898 - Environmental Justice

Implementation of any project alternative is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations.

Executive Order 12962 - Aquatic Systems and Recreational Fisheries

No significant adverse effects to freshwater or marine resources would occur with the application of Forest Plan standards and guidelines. Post-project road closures would limit road use to non-motorized access, except on the road south of Monie Lake under Alternatives 4 and 5. However, most recreational fishing throughout the Tongass occurs by boat in saltwater, and any adverse effects would be minimal.



- Project Boundary
- Freshwater
- Saltwater
- Encumbered National Forest System Land
- State & Private Land
- High Volume Strata
- Medium Volume Strata
- Low Volume Strata
- Second Growth
- AHMU Class 1 & 2 Streams
- VCU Boundary



1 0 1 Miles

U.S.D.A. Forest Service - Alaska Region

"The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. Original data elements were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may not be updated, corrected, or otherwise modified without notification. For additional information about this data, contact Tongass National Forest, Ketchikan Area, Craig Ranger District."

Cholmondeley
DEIS
November 2000

Alternative 1
(Existing Condition)

Figure 2-1





- Project Boundary
- Freshwater
- Saltwater
- ▨ Encumbered National Forest System Land
- State & Private Land
- Proposed Units
- AHMU Class 1 & 2 Streams
- VCU Boundary



1 0 1 Miles

U.S.D.A. Forest Service - Alaska Region

"The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. Original data elements were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may not be updated, corrected, or otherwise modified without notification. For additional information about this data, contact Tongass National Forest, Ketchikan Area, Craig Ranger District."

**Cholmondeley
DEIS
November 2000**

Alternative 2

Figure 2-2



- Project Boundary
- Freshwater
- Saltwater
- Encumbered National Forest System Land
- State & Private Land
- Proposed Units
- Planned Roads
- AHMU Class 1 & 2 Streams
- VCU Boundary



1 0 1 Miles

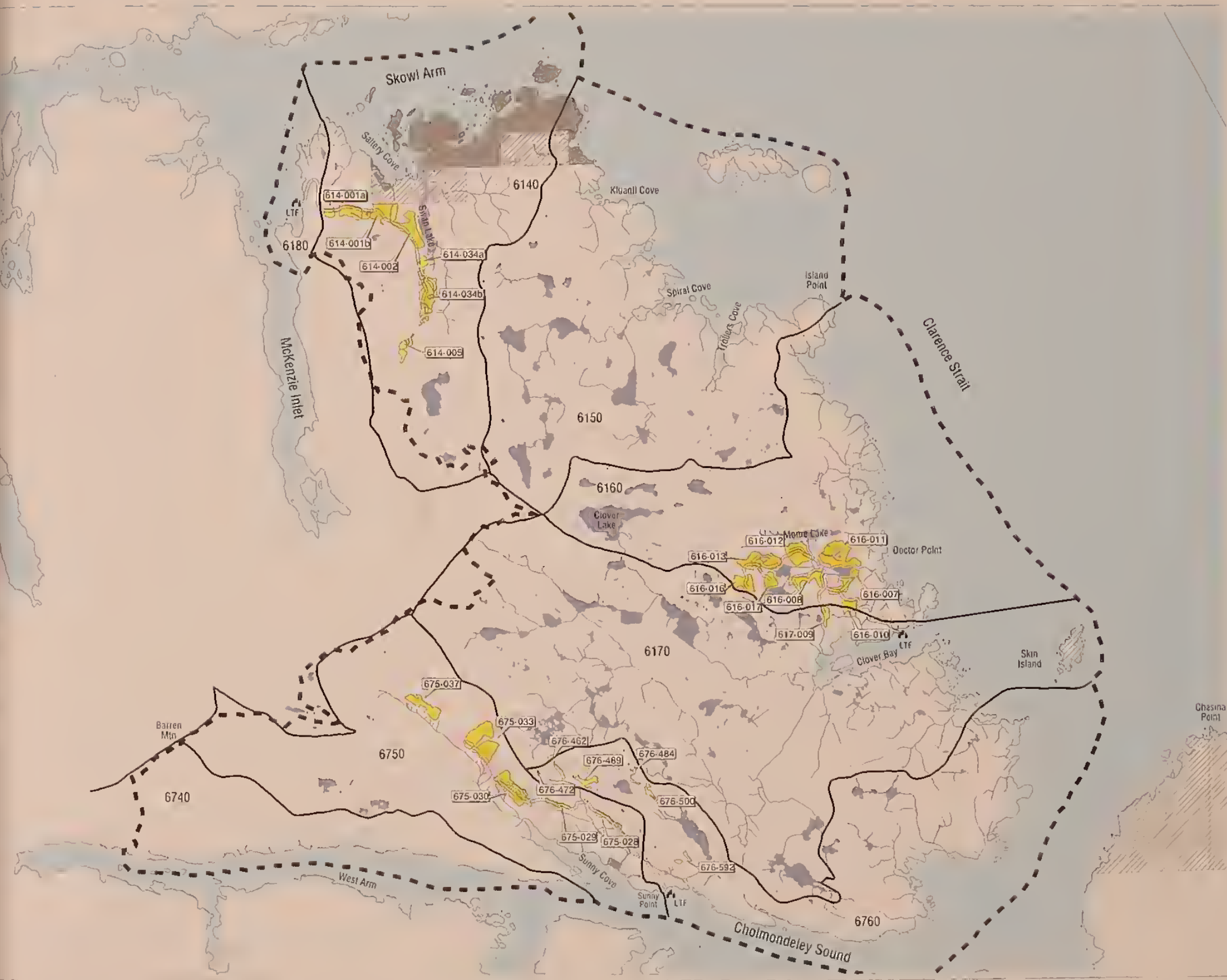
U.S.D.A. Forest Service - Alaska Region

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Cholmondeley
DEIS
November 2000

Alternative 3

Figure 2-3



- Project Boundary
- Freshwater
- Saltwater
- ▨ Encumbered National Forest System Land
- State & Private Land
- Proposed Units
- Planned Roads
- AHMU Class 1 & 2 Streams
- VCU Boundary



1 0 1 Miles

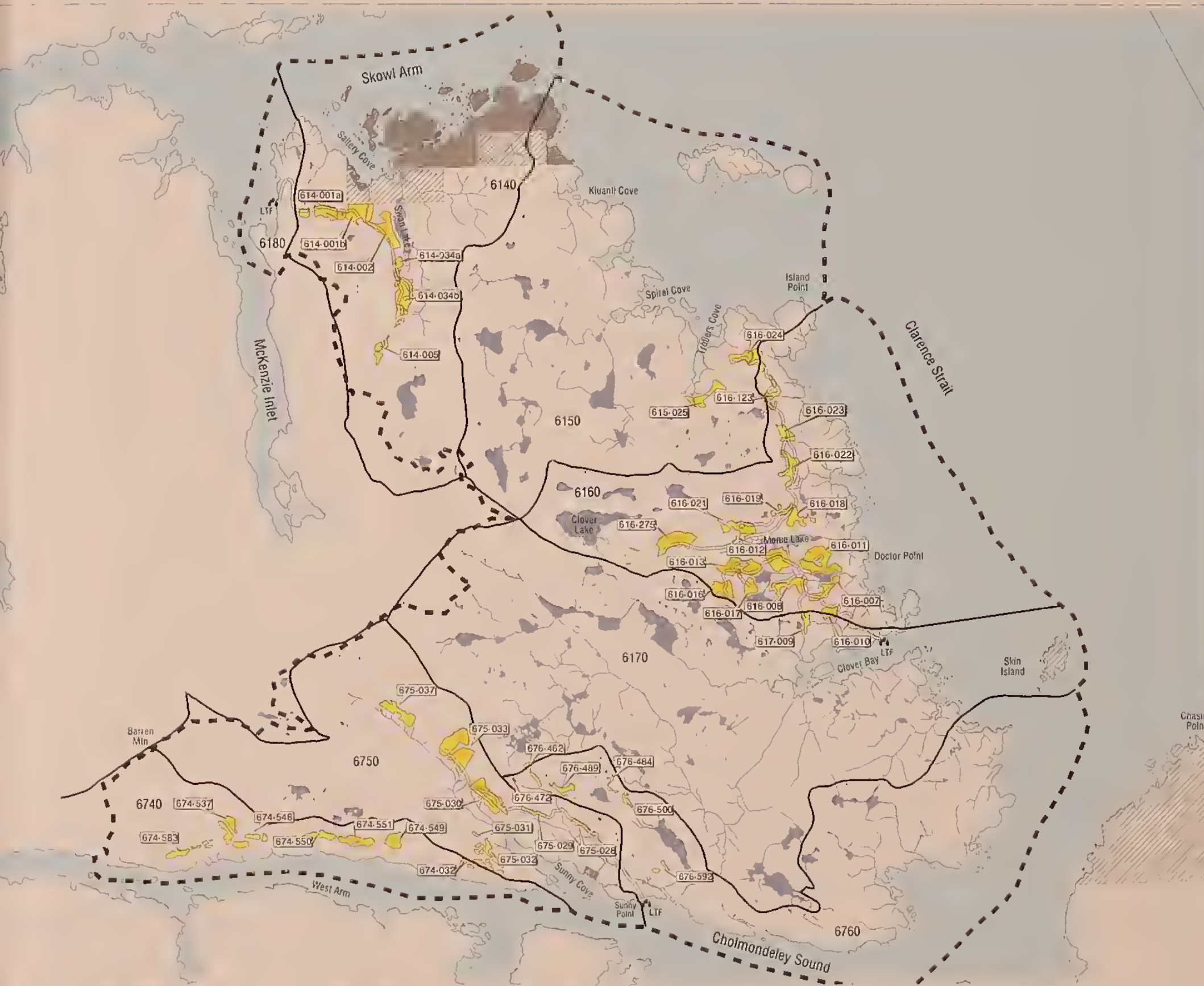
U.S.D.A. Forest Service - Alaska Region

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Cholmondeley
DEIS
November 2000

Alternative 4

Figure 2-4



- Project Boundary
- Freshwater
- Saltwater
- Encumbered National Forest System Land
- State & Private Land
- Proposed Units
- Planned Roads
- AHMU Class 1 & 2 Streams
- VCU Boundary



1 0 1 Miles

U.S.D.A. Forest Service - Alaska Region

The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. Original data elements were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may not be updated, corrected, or otherwise modified without notification. For additional information about this data, contact Tongass National Forest, Ketchikan Area, Craig Ranger District.

Cholmondeley
DEIS
November 2000

Alternative 5

Figure 2-5



- Project Boundary
- Saltwater
- Encumbered National Forest System Land
- State & Private Land
- Proposed Units
- Planned Roads



1 0 1 Miles

U.S.D.A. Forest Service - Alaska Region

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Cholmondeley
DEIS
November 2000

Transportation Map

Figure 2-6



Chapter 3

Affected Environment and Environmental Consequences

Chapter 3

Abstract Environment
Experiment
Conclusions

Chapter 3

Affected Environment and Environmental Consequences

Introduction

This chapter provides information about the existing environment of the Cholmondeley Project Area, and potential consequences to that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in Chapter 2. Each resource potentially affected by the proposed action or alternatives is described.

All significant or potentially significant effects, including direct, indirect and cumulative effects, are disclosed. The methods by which potential adverse effects would be reduced or mitigated are described (see also Chapter 2, and Appendices B, C, and D).

The discussions of resources and potential effects are tiered to information in the Forest Plan, Forest Plan FEIS, 1999 Forest Plan Record of Decision (ROD), the "Forest Plan Implementation Policy Clarification" memo (USDA 1998b), and the "Implementation of the Tongass Land Management Plan" memo (USDA 1999c). The discussions also incorporate information from resource reports, other project EIS's, and referenced scientific literature. The planning record for the Cholmondeley Project includes all project-specific information and documentation of public involvement. It is located at the Craig Ranger District Office in Craig, Alaska, and is available for review during regular business hours. Information from the record is available upon request.

Land Divisions

The land area of the Tongass National Forest has been divided in several different ways to describe the different resources and allow analysis of how they may be affected by Forest Plan and project level decisions. These divisions vary by resource since the relationship of each resource to geographic conditions and zones also varies. The allocation of Tongass Forest Plan land use designations (discussed in Chapter 1) is one such division. Two divisions important for the present effects analysis are described briefly here.

Wildlife Analysis Areas (WAA's)

Wildlife Analysis Areas correspond to the "Minor Harvest Areas" used by the Alaska Department of Fish and Game. The Cholmondeley Project Area includes WAA's 1212

3 Environment and Effects

(97 percent), 1213 (43 percent), and WAA 1214 (1 percent) (Figure 3-1). Wildlife and subsistence analyses use the WAA as the basis for assessing effects on game animals, such as deer, bear, and wolves.

Value Comparison Units (VCU's)

Value Comparison Units are geographic areas that contain a drainage basin of one or more large stream systems. The boundaries usually follow major watershed divides. The project area includes VCU's 614, 615, 616, 617, 618, 674, 675, and 676. For analysis purposes the project area boundaries generally coincide with the VCU boundaries (Chapter 1, Figure 1-2). Silviculture, Old-growth Habitat LUD, and Forest Plan requirements are assessed on a VCU basis.

Analyzing Effects

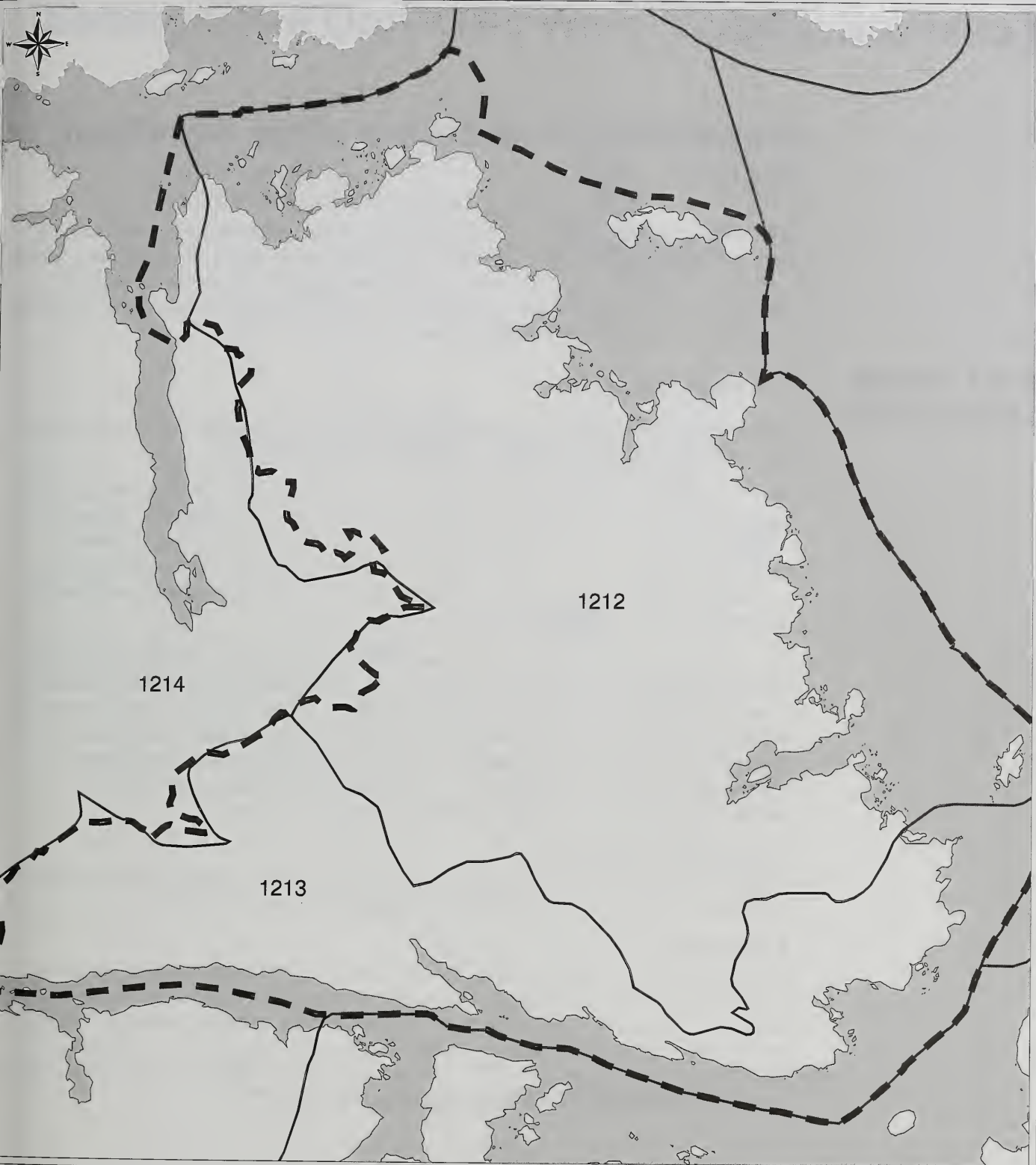
Environmental consequences are the effects of implementing an alternative on the physical, biological, social and economic environment. The Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act (NEPA) include specific categories for the analysis of environmental consequences. Those categories applicable to this analysis are described below.




Direct, Indirect, and Cumulative Effects

Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or that are spatially removed from the activity, but would be significant in the foreseeable future. Cumulative effects result from incremental effects of actions, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

Unavoidable Adverse Effects

Many adverse effects can be reduced, mitigated or avoided by limiting the extent or duration of effects. The ID team designed the harvest units, roads and their placement to eliminate or lessen the significant adverse effects. The application of Forest Plan standards and guidelines, Best Management Practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. These measures are discussed throughout this chapter. Despite our best efforts to limit adverse effects, some may still occur. The purpose of this chapter is to fully disclose these effects.



-  Saltwater
-  WAA Boundary
-  Project Boundary

CHOLMONDELEY DEIS

November 2000
Wildlife
Analysis Area

2 0.0 2 miles

Figure 3-1



Environment and Effects of the Significant Issues

The effects of timber harvest on the significant issues, as detailed in the alternatives, are discussed in this section. The affected environment is briefly described as it relates to the particular resource discussion. Conditions under the No Action alternative generally would remain in their current state, subject to natural forces. This alternative is used to compare the effects of the action alternatives.

Issue 1: Effects on Sallery Cove

Domestic Water

Residents and Sportsman's Cove Lodge owners are concerned that timber harvest and road construction would adversely affect their drinking water.

Most undisturbed sites in the project area are resistant to surface erosion because they are protected by surface layers of organic matter and roots of vegetation. However, when mineral soils are exposed, erosion can occur. The rate of erosion depends primarily on the amount of disturbed ground cover, erodability of the soil, and the steepness of slope. Timber harvest activities and road construction may increase the erosion rate by exposing mineral soil.

Two watersheds contain the streams used for domestic water by several yearlong and seasonal residents in Sallery Cove (Figure 3-2). Sportsman's Cove Lodge operates a Class B (greater than 25 people) public water system. Class B public water systems are required to have filtration and treatment systems. The private water systems are not required to have filtration or treatment. These systems have experienced regular clean-out intervals and periods of low flow where some systems dry up and neighborhood sharing occurs (Watershed Report, project file).

Alternative 1 (No Action)

Alternative 1 has no harvest treatments or road construction. Natural levels of run-off, sedimentation, and potential windthrow would occur in the watersheds.

Alternative 2

No road construction is planned under this alternative, and logs would be yarded by helicopters (full-log suspension). Two of the streams used for domestic water flow through Units 614-001a and 614-001b. Potential effects to water quality would likely be limited to blowdown of stream buffers. The stream buffer in Unit 614-001a is 250 feet wide on the windward side of the stream and 100 feet wide on the lee side, to limit the potential for blowdown (Appendix B).

Saltery Cove Domestic Water Supply Streams



- Streams
 - Class I
 - Class II
 - Class III
 - Class IV
- Roads
- Lakes
- Watershed Boundary
- 40' contours
- Harvest Units
- Encumbered Land
- Private Land
- Water Intake

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Figure 3-2

3 Environment and Effects

The ID team prescribed even-aged clearcut with reserves as the primary silvicultural system. The yarding method would be full suspension using helicopters, which causes less ground disturbance or damage to residual trees than cable systems. Thus, more trees with a diameter breast height (DBH) of 9 inches or less would be left standing in the units and ground disturbance would be negligible (Silviculture Report, project file). Approximately 15 percent of the overstory (DBH greater than 9 inches) would also be left in the units to meet wildlife requirements. Distribution of these retained trees would be scattered through the unit or clumped in groups depending on their windfirmness, logging safety, and the specific conditions of the unit. Seasonal helicopter yarding restrictions would not be imposed and we would expect full yarding operations during the drier periods. The stream buffers and harvest prescriptions would result in levels of sediment similar to natural conditions.

Alternative 3

As in Alternative 2, no road construction is planned and logs are yarded by helicopter. Two of the streams used for domestic water flow through Units 614-001a and 614-001b. The western stream used for domestic water would have a 500 foot buffer – a 250 foot no-cut buffer and adjacent 250 foot buffer retaining 50 percent of the original stand density. The eastern stream buffer in Unit 614-001b would extend 25 feet beyond the slope break.

The two-aged silvicultural system of clearcut with reserves is the primary method of regeneration prescribed under this alternative (memo, Tom Puchlerz, April 5, 2000). Tree density would decrease beyond the stream buffers to 25 percent of the original stand density in the harvest unit. This prescription leaves the highest residual stand density throughout the units when compared with the prescriptions in the other alternatives. The windthrow potential under this alternative would be low. Restrictions on helicopter yarding to Sallery Cove would extend operations into wetter periods (see alternative descriptions, Chapter 2). This alternative would have the least ground disturbance because of the number of residual trees left in the unit and full-suspension yarding. Sediment levels would remain within natural parameters.

Alternative 4

Road construction and timber harvest are proposed in both watersheds. The prescribed silvicultural system is the same as in Alternative 2, however the units would be yarded by a combination of helicopter and partial suspension cable systems. Partial suspension typically results in less than 5 percent soil disturbance in a harvest unit. The stream buffers should trap sediment before it reaches the streams.

Two stream crossings are located in the domestic watersheds. These crossings are approximately one-half mile from the nearest residence. Fine sediment would likely enter the stream in Unit 614-001b during installation of the log stringer bridges, and hauling of rock and logs. The topography adjacent to the stream is such that the road would likely slope toward the stream. Fine sediment would be generated from the road surface during wet weather. Road location and design could reduce, but not eliminate, fine sediment inputs. Sediment traps, such as hay bale dams or small settling ponds, would be used as necessary to reduce sediment entering streams following road construction. A log stringer bridge would be used instead of a culvert to cross the larger stream in Unit 614-001a. The crossing would be designed so the road slopes and directs surface runoff away from the stream (Appendix C). Turbidity would be minimal and of short duration at this crossing. The lodge's filtration system can filter out the fine sediments though private water systems without filters may notice turbidity at the tap. Turbidity monitoring would be used during construction

and haul to keep turbidity within Alaska state water quality standards. Residents of Sallery Cove will monitor water quality in domestic water supply streams and notify the Forest Service if water quality deteriorates. The Forest Service will take action to insure unacceptable conditions are fixed.

The Forest Service has designed mitigation measures (Appendix C) to reduce the potential of petroleum product pollution in all streams, including those in domestic watersheds. Forest Service contract specifications require the road and logging contractor to ensure that any petroleum spill does not enter any stream. The sale purchaser must have a Spill Prevention Control and Countermeasures Plan (SPCC), certified by a registered professional engineer if fuel is stored on site (C6.341 Prevention of Oil Spills). Maintenance operations shall have a containment system to prevent site contamination. Plans shall be in place prior to any construction. All applicable state and federal laws would be enforced.

Alternative 5

Alternative 5 proposes management similar to Alternative 4 in Sallery Cove and would have similar effects as those listed above.

Scenery

The natural scenic backdrop to the south of Sallery Cove is a major part of the "Alaska wilderness experience" enjoyed by the residents of Sallery Cove and marketed by Sportsman's Cove Lodge.

Long, broad ridges made up of generally steep valley walls that have a uniformly forested appearance characterize the terrain to the south and west of Sallery Cove. Elevations of these ridges and summits are approximately 2,000 feet above Sallery Cove. The viewshed to the south and southwest has a natural, unaltered appearance except for the private residences and lodge (Figure 3-3).

The viewshed to the north and west across Skowl Arm is private land and has been extensively logged in recent years. Most of the low-lying terrain around the cove is private land or encumbered national forest. The national forest maintains 1,000-foot 'no-cut' buffers on all its shorelines. The project area is visible from boats or airplanes but not from the residence or lodge locations.

The ridge southeast of Sallery Cove is allocated to the Old-growth Habitat LUD with a visual quality objective (VQO) of Retention. The rest of the national forest in this area is allocated to the Timber Production LUD with a VQO of Maximum Modification. The cove has a high degree of solitude broken only by occasional float planes or boats. Supply boats, commercial fishing boats and log rafts travel past the cove in Skowl Arm, between Polk Inlet and Ketchikan.

Swan Lake sits at the mouth of a U-shaped valley with steep, uniformly forested slopes rising to broad ridges on either side of the lake. The ridges on each side rise to about 2,000 feet. The landscape around the lake is natural and unaltered. The entire viewshed is designated Timber Production with a VQO of Maximum Modification. Main viewpoints occur along the northwest shore of the lake.

Alternative 1

No changes to the scenery would result from implementing this alternative. Occasional log rafts from other sales in the area would pass by the mouth of Sallery Cove.

3 Environment and Effects

Alternative 2

The VQO for harvest units 614-001a and 614-001b meet a VQO standard higher than the required Maximum Modification. Several variations of clearcuts with reserves are prescribed for different portions of these two units. Unit 614-001a would have alternating cut and leave strips. Unit 614-001b would leave about 10 percent of the overstory throughout the unit or in patches as opportunities and safety allow. The retained structure would break the units long backline and create the appearance of smaller clearcuts. Residual trees and buffers would temper the visual impacts of both Units 614-001a and 614-001b. These practices decrease the number of trees cut, create openings that blend with the terrain and decrease the associated visual impact. The overall impact of this treatment would meet the VQO of Modification (Figure 3-4).

The VQO west of Swan Lake is Maximum Modification. Unit 614-002 is a large unit directly above the west shore of Swan Lake. A 200-foot 'no-cut' buffer would be left around the lake. Extending 300-600 feet beyond this buffer would be a series of tapered retention corridors that would be 200 feet wide nearest to the lake. Unmerchantable trees would be left in the rest of this unit and in the harvested areas between the retention corridors. The lake buffer and the unharvested corridors would screen much of the logged areas. The visual impacts of harvesting this unit would be most obvious from the northeast corner of the lake. Many recreationists walk the trail located on the northwest shore of the lake. Only small portions of the backline would be visible from other viewpoints of the lake. Harvesting this unit as described above would result in meeting a Partial Retention VQO from the trail and most viewpoints on the lake.

Unit 614-034a would meet a VQO of modification. It is located on a knob south of the lake. The unit blends well with the terrain and would be broken up by stream buffers and patches of unharvested trees. However, it is still dominant in the middleground. Units 614-002 and 614-034a both meet a VQO that is higher than the VQO recommended in the Forest Plan.

Alternative 3

The visual effects of harvest under this alternative would be less than Alternative 2 in both the Swan Lake and Sallery Cove viewsheds. In the unit above Swan Lake (614-002), the prescribed silviculture system would result in a stand with about 50 percent of the original stand density. This stand density extends 200 feet beyond the lake buffer to about 200 feet below the backline. The no-cut buffer and the adjacent 50 percent retained stand density would screen much of the remaining unit and the upper 50 percent removal would soften the length of backline that is still visible. About 25 percent of the original stand density would be retained in the rest of the unit. In Units 614-001a and 614-001b, additional stream buffers would be applied (Appendix C). The overall visual effect in both units would meet a Partial Retention VQO, which is a higher standard than required by the Forest Plan (Figure 3-5).

Alternative 4

The visual effects of harvest would be similar to Alternative 2 except that fewer trees would be left in the cable-yarded corridors above Swan Lake. The resulting effect may meet a Modification VQO but would remain well within the guidelines of a Maximum Modification VQO. The impacts of harvesting Unit 614-034 would be the same as in Alternative 2.

The LTF would not be visible from Saltery Cove but would have extensive visual impacts from the mouth of McKenzie Inlet. The operating area, an excavated back wall, the area from the ramp to the water, and the steep, full bench road accessing the operating area would directly face the water. No opportunities to screen the area have been found. In 5-10 years, the area would be partially screened by alder. This development would not meet the VQO of Maximum Modification (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file). These impacts would be clearly visible to Saltery Cove clients traveling in McKenzie Inlet.

Alternative 5

The visual effects of harvest and the LTF would be the same as in Alternative 4.

Lodge Business

Clients and local residents enjoy the "wild" scenery and solitude while canoeing or hiking around Swan Lake, fishing in Clarence Strait, sightseeing in Saltery Cove and McKenzie Inlet, or relaxing during the quiet evening. The clients' main activity is saltwater fishing outside of the project area. The lodge's high use period ranges from June 1 through September 30.

The Sportsman's Cove Lodge has 30 summer and 8 year-round employees. The lodge has been sold out one year in advance between Memorial Day and September 30 for the past six years. Annual gross income has been \$1.6 million per year with clients generally spending about \$1,000 per day on their vacation package (including transportation). At full capacity the lodge can house 24 people. The lodge books about 1,000 clients per season, about half of which are return clients.

The lodge generally takes its clients saltwater fishing between Thorne Bay and Cape Chacon. The clients appreciate the solitude of the cove but are not opposed to timber harvest. Evidence of past logging exists in the surrounding areas of McKenzie Inlet, Skowl Arm and Polk Inlet. The lodge owners are shifting their focus from strictly saltwater fishing to promoting an "Alaskan Wilderness Experience." They are placing additional emphasis on marine and terrestrial wildlife viewing, particularly by offering evening tours in McKenzie Inlet. On stormy days in Clarence Strait, they take clients to see the fish pass at Dog Salmon Creek in Polk Inlet.

Alternative 1

Changes in the lodge business would not result from activities on National Forest.

Alternative 2

We expect no negative effects to the quality of the saltwater fishing experience offered by Sportsman's Cove Lodge. Most sportsfishing activities occur outside the project area and Saltery Cove. Changes to the surrounding scenery created by timber harvest would change the "Alaskan Experience" as defined by the lodge owners. Harvest activities would be seen and heard by clients while recreating in Saltery Cove or on Swan Lake. Helicopters would yard logs to the east end of Saltery Cove. Logs would be dropped onto a barge or into a water bagboom. Disturbance from these activities may include high noise levels during the long daylight hours. Flight path restrictions would be placed on the operation to avoid flights over residences. Timber harvest would be completed in the shortest time period relative to the other alternatives since there would be no timing restrictions on helicopter operations. We do not anticipate a floating log camp in Saltery Cove because of existing camps nearby.

3 Environment and Effects

The lodge owners indicated that their clients would generally not be concerned about timber harvest and associated activities. The high demand for the lodge's services would allow any vacancies created by timber harvest activities to be filled by other waiting clients. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs (Social Economic Report, project file).

Alternative 3

This alternative harvests less volume than Alternative 2, resulting in fewer visual impacts. Restrictions of helicopter flight paths and periods of operations would decrease the disturbance to residents and lodge clients. Helicopter yarding operations would be allowed in Saltery Cove only between the hours of 7am and 3pm between Memorial Day and the end of September. These hours coincide with the period when most clients and residents are fishing outside of the cove. These restrictions would extend operations, possibly into a second season. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs (Social Economic Report, project file).

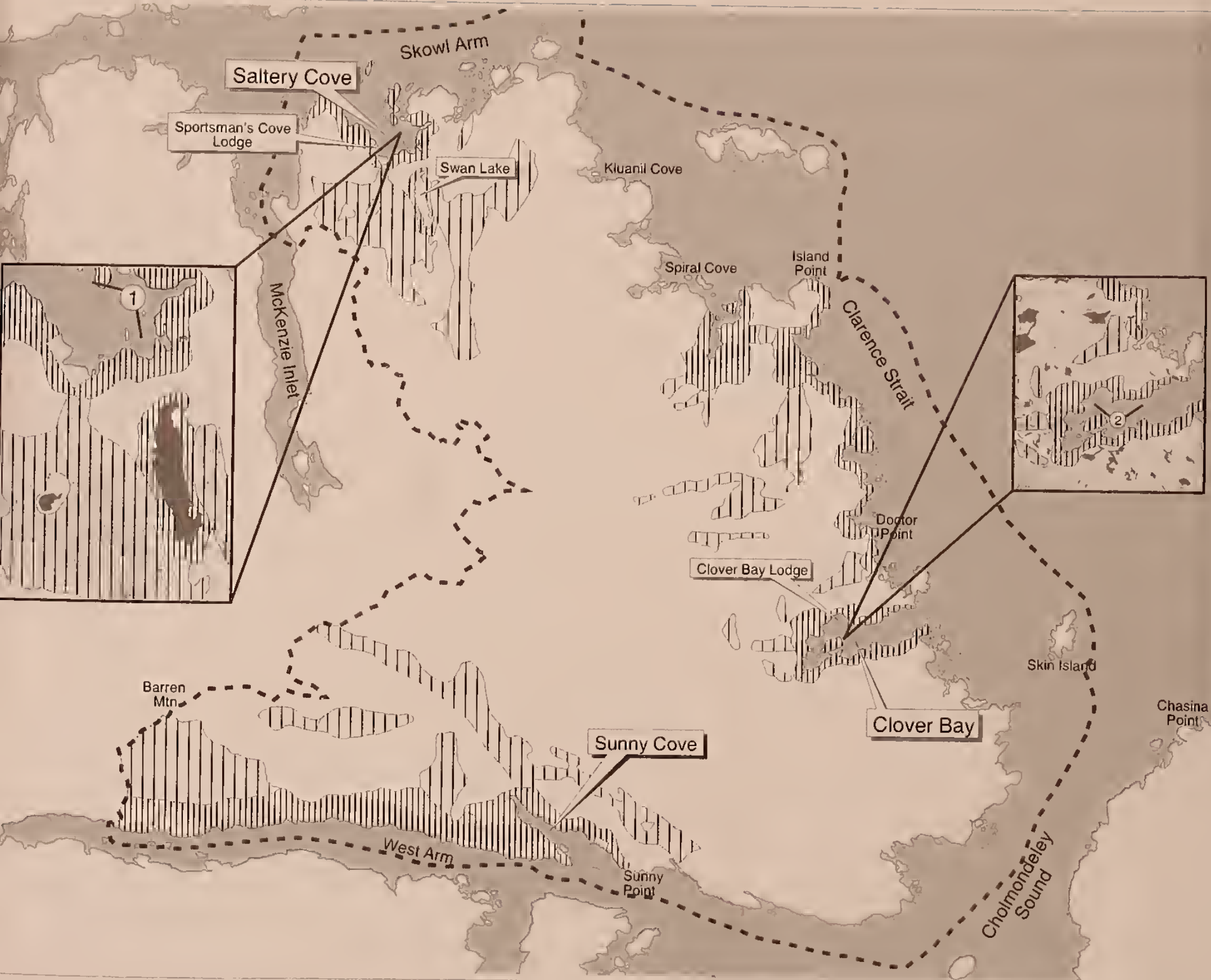
Alternative 4

The effects of this alternative are slightly higher than Alternative 2. The LTF and road construction would create additional noise and visual impacts. This noise would be a quarter mile or more south of the cove and would not directly affect activities in the cove. Timber harvest operations may take 3-4 years to complete because of the road and LTF construction and the layout of cable yarding systems.

Timber harvest activities may cause a decrease in occupancy rates or a shift in the clientele. The type of recreational activities and services offered or marketed would be determined by the resiliency of the lodge and Saltery Cove community. Based on information provided by the lodge owners, they would anticipate a moderate risk of losing recreation industry jobs (Social Economic Report, project file).

Alternative 5

The effects of this alternative would be the same as in Alternative 4, above.



- Project Boundary
- Freshwater (Inset Maps Only)
- Saltwater
- Contours (Inset Maps Only)
- Viewsheds Analyzed**
 - ▨ Foreground
 - ▤ Middleground



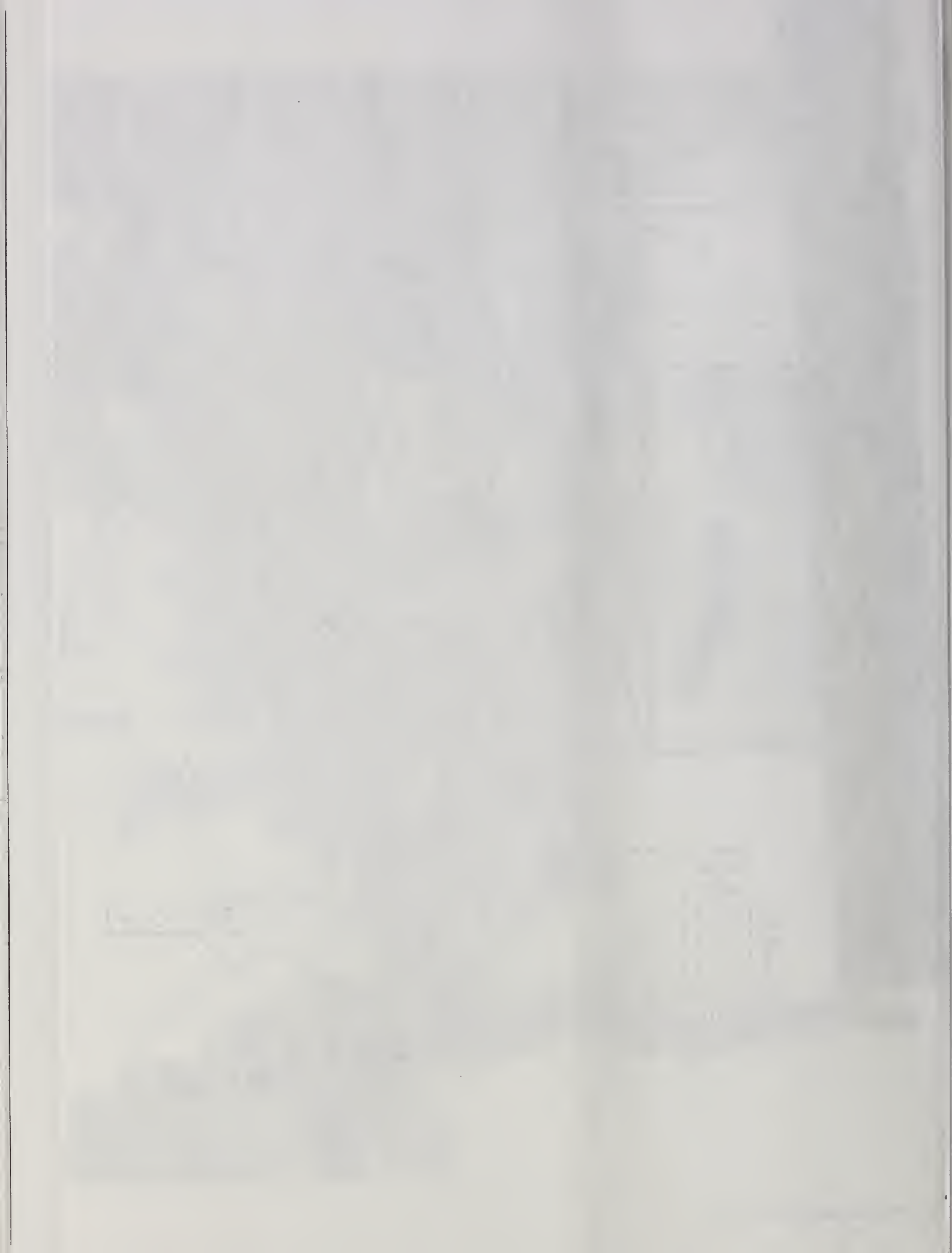
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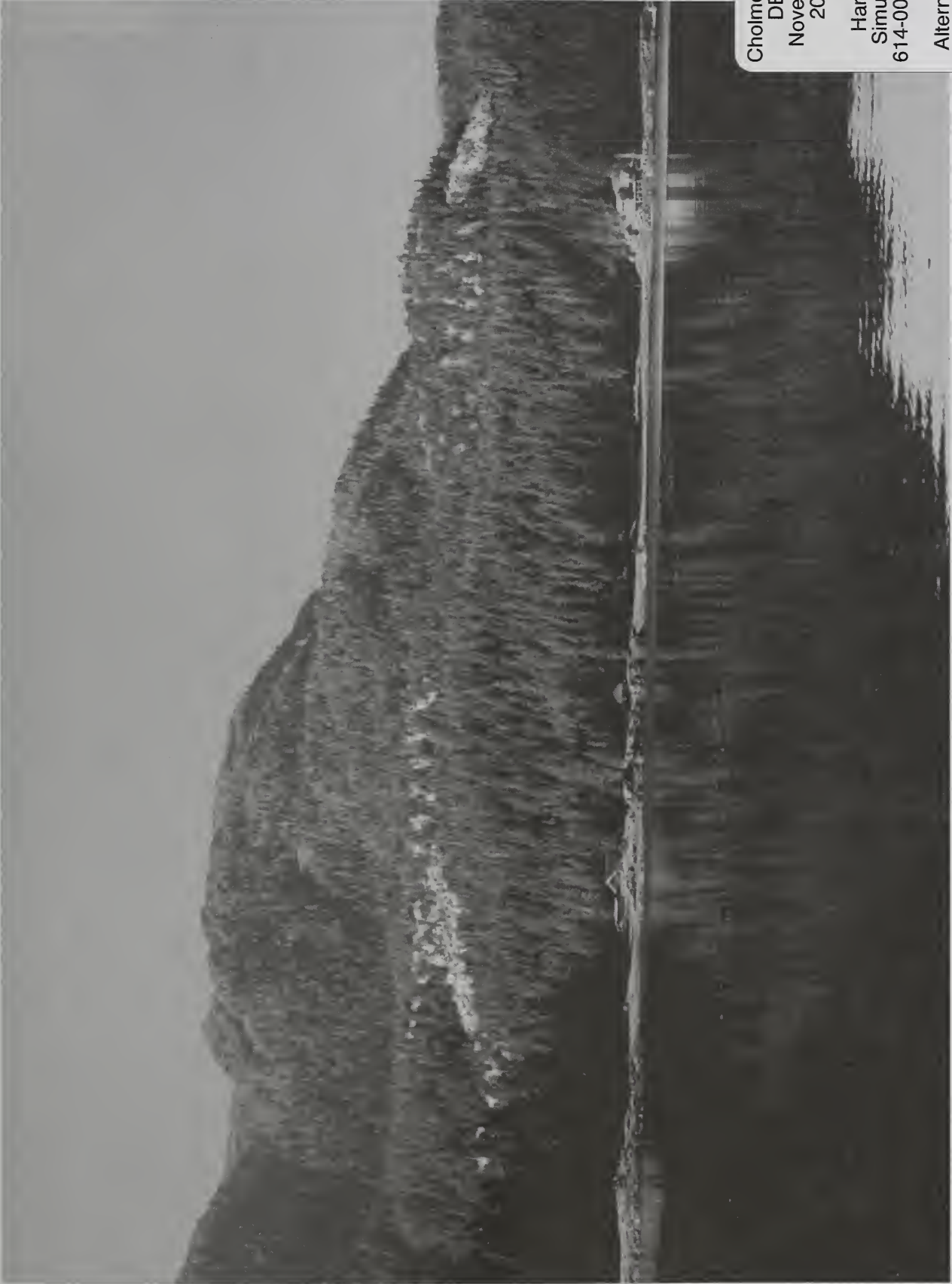
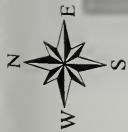
U.S.D.A. Forest Service - Alaska Region

"The Forest Service cannot assure the reliability or suitability of this information for a particular purpose. Original data elements were compiled from various sources. Spatial information may not meet National Map Accuracy Standards. This information may not be updated, corrected, or otherwise modified without notification. For additional information about this data, contact Tongass National Forest, Ketchikan Area, Craig Ranger District."

**Cholmondeley
DEIS
November
2000**

**Viewshed Map
Figure 3-3**





Cholmondeley

DEIS

November

2000

Harvest

Simulation

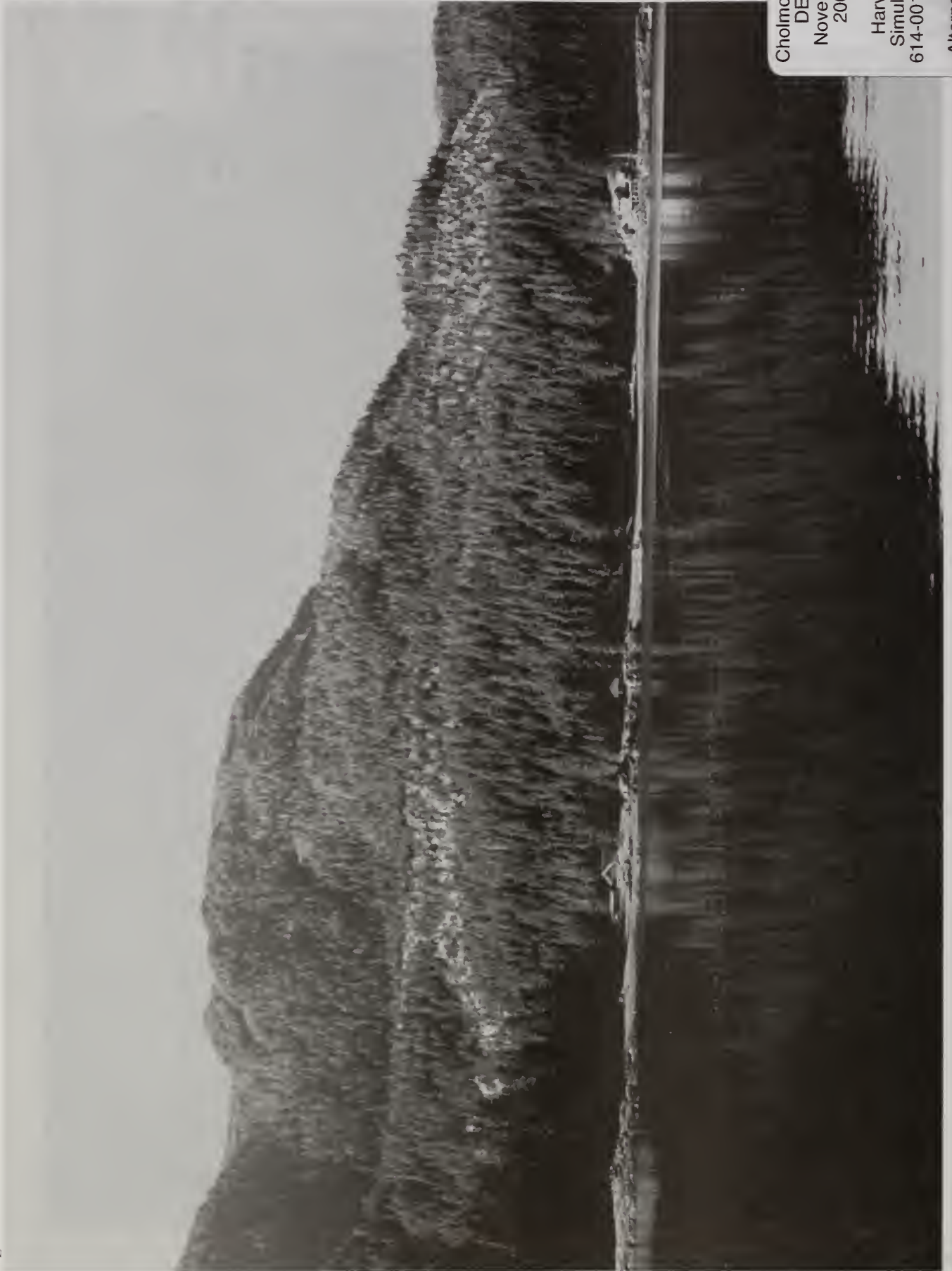
614-001 A & B

Alternatives

2, 4, & 5

Figure 3-4

Not to Scale



Cholmondeley
DEIS
November
2000
Harvest
Simulation
614-001 A & B
Alternative 3

Community Privacy and Security

The residents are concerned that additional road access would disrupt the peace and security of their homes and cabins. They believe roads would invite ATV use and additional hunters to the area. They are afraid hunters would be shooting close to their homes and cabins and the increased mobility would promote vandalism and theft.

A small community nestled on the southwest shore of the SALTERY Cove. Sportsman's Cove Lodge is also located in the cove. Residents and visitors to the cove value its scenic beauty, solitude, and peacefulness. The remote character and lack of roads were among the qualities that drew them to this location.

Sportsman's Cove Lodge is the largest source of noise, with the use of boats and floatplanes to transport their guests to various destinations. Natural sights and sounds, however, still predominate.

Alternative 1

No changes would occur to the security, solitude, and peacefulness of the local surroundings.

Alternative 2

Noise levels created by chainsaws and helicopters would increase during timber harvest operations. However, since no roads would be built, no changes in access would occur.

Alternative 3

Effects of this alternative would be the same as Alternative 2.

Alternative 4

Noise levels would increase in the area as a result of chainsaws, cable yarders and logging trucks. An LTF in McKenzie Inlet, 4.25 miles of specified road construction, and 0.4 miles of short-term road construction would provide access to the area behind the residences and lodge. These roads would be closed to motorized uses by blocking them with boulders, removing culverts and bridges, or otherwise making them impassable. A closure order would enforce the restriction against motorized uses. "Walk-in" hunting may increase; however, the road would be more than one-third mile from the community.

Alternative 5

The effects of this alternative would be the same as Alternative 4.

Wind

Residents of SALTERY Cove are concerned that large clearcuts would funnel wind and increase the potential for property damage at their residences and anchorages.

Alternative 1

Winds tend to come from the south and west of SALTERY Cove. No changes in the wind patterns or to anchorage safety would occur in SALTERY Cove beyond the natural level of risk.

Alternative 2

The helicopter yarding system used in this alternative would leave more trees in the harvest units and along streams. Forest canopy openings would be kept relatively

3 Environment and Effects

small, and no roads would be built. These practices would retain wind resistance within the units. In addition, the forest surrounding the community would provide a buffer around the cove. Some windthrow may occur, but it should be limited to individual trees, and wind speeds should dissipate before reaching the cove (Silviculture Report, project file). Large wind events are part of the disturbance regime of these ecosystems. Though they occur infrequently, they can blow down entire stands. Timber harvest under this alternative would have little influence on the outcome of a large wind event.

Alternative 3

The effects of this alternative would be similar to Alternative 2. More trees would be left in the units to mitigate visual concerns, which may also mitigate wind effects.

Alternative 4

Roads would be built under this alternative, but the same mitigation measures within harvest units would be applied as in Alternative 2. While the roads may enhance wind speed, the beach buffer and structure left in the units should be wide enough to dissipate it (Silviculture Report, project file).

Alternative 5

The effects of this alternative would be the same as Alternative 4.

Issue 2 - Effects on Clover Bay

Scenery

Clover Bay Lodge owners are concerned that any change in the natural setting would negatively impact their clientele by impacting their "wilderness experience."

The gently rolling terrain immediately around the north and south shores of Clover Bay is uniformly forested. Massive cliffs and rock outcrops dominate the head of the bay. Seal haul-outs are located along the south shore of the cove. The area south and west of Clover Bay is allocated to the Old-growth Habitat LUD with a VQO of Retention. The area north of the bay is allocated to the Timber Production LUD with a VQO of Modification in the foreground and Maximum Modification in the middleground. Almost all the area seen from the bay in this LUD is in the foreground. The viewshed is presently in a natural, unaltered condition except for the floating lodge and its associated floats and ties to the north shore.

The intricate shoreline and terrain between Clover Bay and Doctor Point has a diverse, rolling, and knobby appearance (Figure 3-3). Further back from shore, the middleground has a similar appearance though larger in scale. Cliffs and rock outcrops are evident in both the foreground and middleground. These larger scale landforms in the middleground mark the edge of a very rugged, diverse series of massive knobs and intervening lake basins located in the middle of the project area, northwest of Clover Bay. Many cliffs and rocky summits dominate the terrain, and the lakes are connected by a variety of rapids and waterfalls. Though the edge of this area is visible from saltwater to the east, its full scenic attributes are only apparent to someone flying over or actually standing in the midst of this rugged landscape. The slopes visible to Clarence Strait are mostly forested, though the area as a whole is predominantly muskeg, alpine and rock. Most of the foreground is allocated to the Old-growth Habitat LUD and within the beach fringe, with a Retention VQO. Most of the middleground is allocated to the Timber Production LUD, which has a VQO of Maximum Modification. The viewshed from Clarence Strait is natural and unaltered.

Alternative 1 (No Action)

No changes to the scenery would result from implementing this alternative.

Alternative 2

The backline of Unit 616-010 and a portion of harvested ground would be visible in the middleground from the south side of Clover Bay (Figure 3-6). It is the only unit visible from the bay. This unit meets the VQO of Modification and would achieve the VQO of Partial Retention within 5-10 years when the unit has regenerated.

Between Clover Bay and Trollers Cove, units 616-022, 616-023, and 616-123 would be harvested on the very visible middleground and foreground slopes above the shoreline (Figure 3-3). The retention of trees in several 100-200 foot corridors in Units 616-022 and 616-023, and leaving reserve trees in Unit 616-123 would reduce the overall scale of harvest (Appendix B). The narrowness of Unit 616-123 and its location reduces its visibility. These harvest treatments would meet the VQO's of Maximum Modification in the middleground and Modification in the foreground.

Alternative 3

The viewshed from Clover Bay would remain unchanged in this alternative because Unit 616-010 would not be harvested. Harvest of all other units would be similar to that of Alternative 2. Therefore, the effects of harvest on the views from Clarence Strait would be the same as described above in Alternative 2.

Alternative 4

The conditions of the viewshed from Clover Bay would be similar to those described under Alternative 2, except for the additional impacts of the LTF and cable yarding in Unit 616-010. The LTF would be located on the north shore and create impacts just inside the entrance of the bay. A 20- to 150-foot vegetation buffer would screen the operating area or sort yard. The short road from the operation area to the water would be partially screened from the south and southwest by a 30- to 50-foot buffer and a 300-foot forested peninsula that juts into the bay. The primary visible element would be a 40-foot-wide rock ramp that would extend about 100 feet into the intertidal zone. This ramp is primarily visible from viewpoints inside the entrance to the bay from south to southwest of the site. From other viewpoints the ramp is screened by vegetation and intervening landforms. This LTF development would meet the VQO of Modification.

Mitigation measures after logging would further lessen the impact. These measures include re-contouring and seeding the cut slopes and seeding the ramp near the shoreline, above normal high tide (Appendix D). Re-vegetation by alder following harvest operations would enhance the screen and reduce the visual effects within 5 to 10 years. Elements of the LTF would remain partially visible to boaters entering the cove. The LTF, sort yard, and roads would also remain visible from the air. Depending on the methods used to get logs from the LTF to the mill, barges or log rafts would be visible during logging operations. Permits obtained from the U.S. Army Corps of Engineers by the contractor would determine where temporary booming areas would occur in Clover Bay.

The visual effects of harvest as seen from Clarence Strait would be much less in Alternative 4 than Alternatives 2 and 3 because the units north of Monie Lake would not be harvested. Small portions of the units just south of Monie Lake would be visible. After harvest, these units would meet the VQO of Modification and almost meet the higher standard of Partial Retention.

3 Environment and Effects

Alternative 5

Visual effects of harvest under this alternative would be similar to those of Alternative 2 as seen from Clover Bay and Clarence Strait. The units would be yarded with cable equipment, so there may be less structure remaining in the units. The visual effects of the LTF in Clover Bay would be the same as those described in Alternative 4.

Lodge Business

The Clover Bay Lodge owners believe that any harvest activity in the area would so negatively affect their clientele that they would have to close their business. The option of moving the lodge to a more remote and undeveloped area on south Prince of Wales Island was briefly discussed with the lodge owners. Costs associated with moving the lodge would include towing costs (\$5,000-10,000 round trip), additional client and supply transportation costs, and some additional start-up costs. Lodge owners believe this to be economically infeasible for their business.

The Clover Bay Lodge is a floating lodge that anchors in Clover Bay between June 1 and mid-August. It is authorized for shore ties and a waterline under a Forest Service special use permit. The lodge owners report that they have hosted about 4,800 people during the past 16 years. They estimate that 85 percent of their business is repeat clients. The lodge employs up to seven seasonal employees in addition to the four owners.

Saltwater fishing between Island Point and Chasina Point and inside of Skin Island is the main activity offered by the lodge. They also provide opportunities to view marine mammals, eagles and bears on the south and east sides of the cove. The lodge gears its marketing to a wilderness/ecosystem/wildlife experience. Lodge clients are described as opposing any activity that leaves its "footprint" on the land or changes the "pristine" character of the area. The length of the lodge's operating season is planned so the exposure of their clients to the commercial seine fishing fleet is limited.

Alternative 1

Changes in the lodge business would not result from activities on national forest.

Alternative 2

The ID team does not anticipate negative effects to the fishing quality in Clarence Strait in any of the action alternatives. Clients may see part of the backline of Unit 616-010 when entering Clover Bay. Scenic changes from Clarence Strait would be inconspicuous until visitors approach Trollers Cove.

Forest Service crews would be present in Clover Bay during reconnaissance and layout of this project. Helicopters would transport crews to units over the several months it would take to complete the work. Crew boats would also be seen on a daily basis. Disturbance associated with harvest operations includes increased noise levels, and the presence of log rafts and floating debris. Helicopter flight paths would be restricted to avoid flights over eagle nests and the lodge; however, no restrictions would be placed on the period of yarding operations. Yarding operations would occur during optimal weather conditions and daily flight period would extend through the daylight hours. Timber harvest and yarding operations in Clover Bay would likely be completed in one season under this scenario. Logs would be yarded with helicopters to a water bag-boom or barge in Clarence Strait or Clover Bay. Log barges may anchor in Clover Bay in the evenings or during storms. We would not expect a floating log camp in the bay because existing camps are located nearby. Log rafts would be visible at the entrance of the bay.

Lodge occupancy rates may decline depending on the actual sensitivity of the lodge clients to timber harvest. A shift in the type of clientele could also result from timber harvest and associated activities. The resiliency of Clover Bay Lodge would determine the type of recreational activities and services offered or marketed. A shift from more primitive to more developed recreational settings may occur, taking advantage of the opportunities created by timber harvest. An analysis of information provided by the lodge owners indicates they would anticipate a moderate risk of losing recreation industry jobs (Social Economic Report, project file). The lodge owners believe that changing their marketing or operating the lodge in another location would be cost prohibitive.

Alternative 3

The effects of this alternative would be similar to Alternative 2 except that Unit 616-010 would not be harvested. Therefore, no effects of timber harvest would be visible from Clover Bay. Yarding logs with helicopters into Clover Bay would not be allowed between June 1 and mid-August. Noise levels would be less than Alternative 2, but operations would likely extend into a second season. Based on information provided by the lodge owners, they would anticipate a low risk of losing recreation industry jobs (Social Economic Report, project file).

Alternative 4

Construction and use of the LTF and roads would create noise and increase the visual effects of this alternative in Clover Bay. The noise level would be less than in the alternatives with helicopter yarding and the daily periods of operation would be shorter. Timber harvest operations may take longer to complete because of the LTF and road construction, and cable unit layout. The increase in harvest operation duration would be offset by the lower volume harvested.

A logging camp may be needed to log the cable units. The camp would be screened from the view of Clover Bay, if it is constructed.

Though the LTF would be screened, occupancy rates may decrease or the type of clientele may shift. There would be a shift from pristine to more developed recreational settings. Based on information provided by the lodge owners, they would anticipate a high risk of losing recreation industry jobs (Social Economic Report, project file). No harvest would be visible from Clarence Strait north of Monie Lake.

Alternative 5

The effects of this alternative would be the same as Alternative 4, except harvest units close to Trollers Cove would be visible from Clarence Strait. Based on information provided by the lodge owners, they would anticipate a high risk of losing recreation industry jobs (Social Economic Report, project file).



Cholmondeley
DEIS
November
2000
Harvest
Simulation
616-010
Alternative's
2, 4, & 5
Figure 3-6

Not to Scale

Domestic Water

Clover Bay Lodge uses a small stream for a few months every summer and operates a Class B public water system.

Alternative 1 (No Action)

No harvest or road construction is planned under this alternative. Windthrow and stream sedimentation would occur at natural levels.

Alternative 2

Negative effects would not be anticipated in the watershed from which Clover Bay lodge gets its water. Timber harvest is proposed in the upper end of the watershed in Unit 616-010. However, the stream adjacent to the unit would be buffered and the unit would be yarded with helicopters. The gently rolling terrain, distance between the unit and stream make it unlikely that sediment would enter the stream.

Alternative 3

There would be no effect to the Clover Bay Lodge domestic water since no timber is harvested from the domestic use watershed.

Alternative 4

A minor amount of road construction and harvest of Unit 616-010 would occur in the watershed Clover Bay Lodge uses for domestic water. Given the location of the road and slopes in the watershed, sediment production would be minimal. It is unlikely that sediment or petroleum products would reach the stream under implementation of this alternative.

Alternative 5

Alternative 5 proposes management similar to Alternative 4 in Clover Bay and would have similar effects as those listed above.

Issue 3 - Effects on Sunny Cove

Domestic Water

Two yearlong residents and several intermittent residents of Sunny Cove get their domestic water from the Drinking Water Watershed east of Sunny Cove. None of the water systems are regulated by the State of Alaska. Residents are concerned that timber harvest and associated activities would reduce the quality of their drinking water.

Alternative 1

No harvest or road construction is planned under this alternative. Windthrow and stream sedimentation would occur at natural levels.

Alternative 2

Two harvest units are located in the watershed from which Sunny Cove residents get their water (Figure 3-7). Unit 675-029 borders a Class II stream that would be protected by a 100-foot buffer. A Class III tributary to the stream used for domestic water runs through Unit 675-028. The no-cut buffer would be increased to 100 feet to protect the domestic water use downstream. In addition, yarding with helicopters allows more trees to be left standing in the units and further reduces the potential for windthrow and sediment production.

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Alternative 3

Timber harvest and road construction are proposed in the watershed from which Sunny Cove residents get their water. The streams adjacent to or within Units 675-029 and 675-028, respectively, are protected as in Alternative 2.

Four crossings on tributaries to Drinking Water Creek are needed to build the road through the watershed. Potential impacts on water quality include sediment generated from culvert installation, truck traffic, and petroleum product spills from refueling or mechanical equipment failures. Methods to reduce the risk of petroleum product pollution and sedimentation are listed on the road cards (Appendix C). Turbid water entering the domestic water intakes can be held to levels slightly higher than natural bank erosion when all of these recommendations are followed. Capping water intakes and timing culvert installation, rock and log haul to avoid high flow periods would also reduce sediment at the intakes. Logs would be yarded from the site with equipment that meets the log suspension requirements to minimize soil disturbance. Storing the roads after silvicultural evaluations would also reduce long-term sediment production (Appendix D).

Alternative 4

The effects on domestic water would be the same as in Alternative 3.

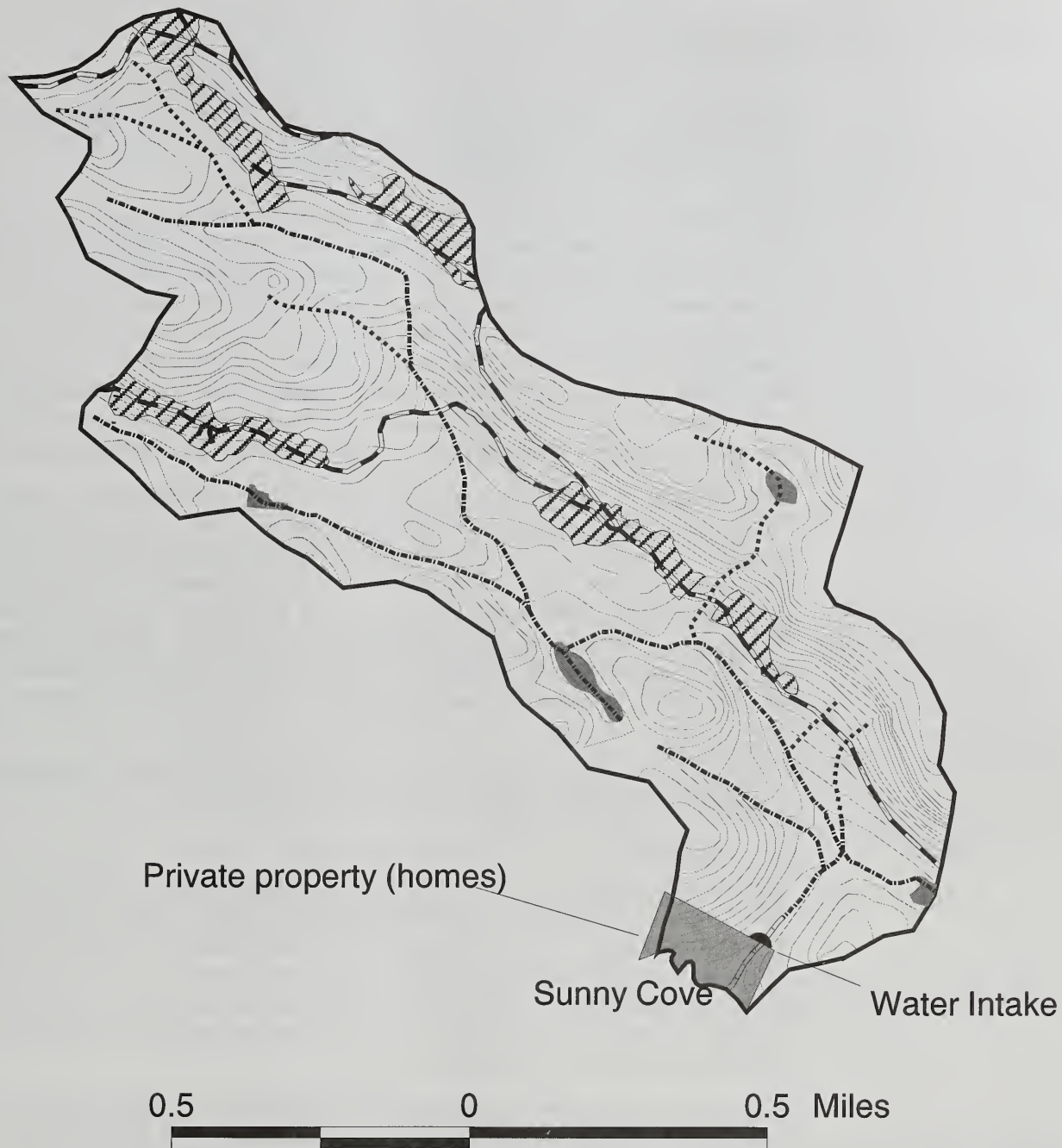
Alternative 5

The effects on domestic water would be the same as in Alternative 3.

Mariculture

Most residents of Sunny Cove share in the operation of an oyster farm that is anchored in the south end of Sunny Cove. The business is in the developing stage and has modest production. The residents anticipate future expansion. The ID team believes most potentially negative effects to mariculture operations would be avoided by not building a road upslope of the operation. No road is planned for construction in these watersheds under any alternative. Thus, only minor effects to the mariculture operation would be possible from Sunny Creek (Watershed Report, project file).

Sunny Cove Drinking Water Watershed



Streams

- Class I
- Class II
- Class III
- Class IV
- Roads
- Lakes

40' contours

Harvest Units

Private Property

Cholmondeley
DEIS

November
2000

Figure 3-7

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Scenery

The residents of Sunny Cove enjoy the scenery and serenity surrounding the cove and their properties. They are concerned about the vast amount of logging that has occurred south of Cholmondeley Sound within their view. They believe the area around their homes is the only unlogged area remaining.

The foreground of the southwestern side of Sunny Cove is a uniformly forested ridge that climbs at a moderate slope and gradually steepens to a ridge about one half mile from the shoreline (Figure 3-3). The viewshed above the northeastern shore is a series of uniformly forested knobs and ridges that form distinct foreground and middleground zones. The southwest side of Sunny Creek is allocated to the Old-growth Habitat LUD and has a VQO of Retention. The rest of the area is allocated Modified Landscape with VQO's of Partial Retention in the foreground and Modification in the middleground. The viewshed is presently in a natural, unaltered condition except for several private residences and a small floating mariculture farm.

The viewshed along the north shore of the West Arm Cholmondeley Sound is characterized by a long, predominantly steep-faced ridge. A distinct network of benches or plateaus separates the foreground from the middleground. The foreground dominates the view, though there are clear views of middleground ridges such as Barren Mountain. Though the foreground face is uniformly steep and forested, a few benches, knolls and drainages create some terrain diversity. The area is allocated Modified Landscape with a VQO of Partial Retention in the foreground and Modification in the middleground. This viewshed is in a natural, unaltered condition.

Alternative 1

Changes to the scenery of Sunny Cove would result from natural disturbances and would likely remain static.

Alternative 2

Harvest of Units 675-031, 675-032, and 674-032 would meet the VQO of Partial Retention as harvested under this alternative (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file). All non-merchantable trees would be left in Unit 675-031. This coupled with the unit's small size (5 acres) reduces any impact from this unit. Units 674-032 and 675-032 include small group selection cuts on the upper part of the unit and Type-C clearcuts on the lower part that retain all non-merchantable trees (see Silviculture section).

The scattered units on the middleground slopes above the northeast shore of Sunny Cove would meet the VQO of Modification. Individual and groups of trees would be left in Units 675-028 and 675-029 to address requirements for marten habitat, stream buffers, and soil protection. These trees also reduce the visual impacts. The retention of islands of trees along portions of the backlines of these units would also soften the edge created by these backlines.

Seven units stretch along the back of the foreground slopes above the north shore of West Arm Cholmondeley Sound. These units would be helicopter yarded which would leave the unmerchantable trees standing in the units. In addition, patch cuts or overstory removals are prescribed for the steeper, more sensitive portions of the units. Streams in Units 674-537 and 674-548 each have buffers to the slopebreak and additional buffers of up to 100 feet (Appendix B). These treatments would leave

enough forested texture to meet the partial retention VQO (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

Alternative 3

The visual effects of harvest would be the same as in Alternative 2 above. The LTF would be located east of the entrance to Sunny Cove. It would not visually impact the Sunny Cove Visual Priority Area or home sites on the north side of the cove. It would be visible from portions of the main body of Cholmondeley Sound. The development would consist of an operating area, ramp, access road and dock. The operating area would be 100 feet by 100 feet. The ramp would be 40-60 feet wide (fill toe to fill toe) and 200 feet long. It would extend off one corner of the operating area to the low tide level. Parallel to this ramp would be a 25-foot wide (fill toe to fill toe) access road to the dock. An excavated rock wall would rise 10-20 feet above the operating area. The development would be partially hidden as it is tucked into a bight. The terrain on the west side of this location hides the LTF from areas west of Sunny Point. The LTF would be visible at an oblique angle from points east. A fringe of vegetation (20 x 75 feet) between the log transfer ramp and the boat dock access road would partially screen the operation area from direct views. This development would be well within the parameters of Maximum Modification VQO.

Alternative 4

The north shore of West Arm Cholmondeley Sound would remain in a natural, unaltered condition since no units would be harvested. The west shore of Sunny Cove would also remain in a natural condition. The scattered units on the middleground slopes above the northeast shore of Sunny Cove would meet the VQO of Modification (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file). Individual trees and groups of trees would be left in Units 675-028 and 675-029 to address requirements for marten habitat, stream buffers, and soil protection. These trees also reduce the visual impacts. The retention of islands of trees along portions of the backlines of these units would soften the edge created by these backlines.

The visual impacts of the LTF would be the same as in Alternative 3, above.

Alternative 5

The visual effects of harvest would be the same as described in Alternative 2, above. In addition, the visual effects of the LTF would be the same as those described for Alternative 3.

Privacy/Security

Residents of Sunny Cove are concerned that a road located one-fourth mile from their homes would invite more use from surrounding communities. They believe ATV use would increase and they would be subjected to more noise, dust, and potential vandalism.

Alternative 1

Access would remain at the current level and few changes to the solitude and peacefulness of the local surroundings would be anticipated.

Alternative 2

Direct effects of this alternative would include increased noise from chainsaws and helicopters. Indirect effects, such as changes in recreation use, would be unlikely.

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since no roads would be constructed under this alternative. The duration of harvest operations would be shortest under this alternative because of the helicopter yarding.

Alternative 3

Direct effects of timber harvest under this alternative would include noise from road construction, cable and helicopter yarding and general industrial noise at the LTF. The noise would be more distant from the community because the logs would be yarded to roads or outside of Sunny Cove. The duration of harvest operations would likely be 2-3 years. The road would create more inland travel routes for other recreation activities though the roads would be closed to motorized use. The roads would be closed to motorized use by blocking them with boulders, removing culverts and bridges, or otherwise making them impassable. The closure of motorized use would be enforced with a closure order. The road system would likely be used by hikers and both recreational and subsistence hunters from Ketchikan and Prince of Wales Island, respectively. Most recreation use and associated impacts would be concentrated along saltwater beaches, the LTF, and road corridors.

Alternative 4

The direct and indirect effects of this alternative would be the same as Alternative 3. The lower harvest level would reduce the duration of operations by one year.

Alternative 5

The direct and indirect effects of this alternative would be the same as Alternative 3.

Subsistence

Subsistence hunters of Sunny Cove believe a change in access to the area could negatively affect their subsistence use by bringing more hunters to the area.

Sunny Cove residents live a subsistence life-style, with hunting, fishing, and gathering being typical activities. Bear are hunted around the Sunny Cove estuary and beaver are trapped from the streams. Kasaan is a nearby subsistence community but shows little use in the project area (Forest Plan FEIS, Appendix H). Ketchikan is not a subsistence community and shows little use of the area for sport hunting.

Alternative 1

Hunting use, especially from outside the area, would remain at its low level.

Alternative 2

We expect no change in the subsistence use of this area (Subsistence Report, project file). No additional roads or access points would be constructed. Competition among subsistence hunters would not change since no changes in access would occur.

Alternative 3

Additional access to the area would be available at the LTF. There could be additional hunting pressure in the area of the LTF and from the road. We anticipate some competition between subsistence users and some competition from Ketchikan hunters (Subsistence Report, project file).

Alternative 4

The direct and indirect effects of this alternative would be same as Alternative 3.

Alternative 5

The direct and indirect effects of this alternative would be same as Alternative 3.

Wind

Sunny Cove residents are concerned timber harvest could change wind patterns and affect the safety of their anchorage and the stability of the stream buffers.

Alternative 1

No changes to wind patterns and velocities would occur beyond what has already occurred as a result of timber harvest on the south side of Cholmondeley. Winds tend to come from the southeast. The safety of the anchorage would remain at its current level.

Alternative 2

More trees would be left in the harvest units and along streams than in the other alternatives. Forest canopy openings would be kept relatively small, and no roads would be built. Some windthrow may occur but it should be limited to individual trees. A 1,000-foot-wide buffer of trees would be retained around the cove to maintain protection of the anchorage (Silviculture Report, project file).

Alternative 3

We expect the wind effects of this alternative to be similar to Alternative 2. There would be a road built north of Sunny Cove and the units associated with it would be logged using ground-based systems. Thus, there would be less structure left in these units. Since these units are north of the cove and the winds tend to be from the southeast, they should not contribute to any wind effects on the anchorage. The units along West Arm would be yarded using helicopters as in Alternative 2 and would likely have the same effects. The effects of windthrow on water quality are discussed under the domestic water supply issue.

Alternative 4

The units along West Arm would not be harvested. The effects of this alternative would be similar to Alternative 1 since no openings are created between the community and the prevailing winds. There could be some windthrow in the units west and north of Sunny Cove but they would have no effect on the anchorage.

Alternative 5

The effects of this alternative would be the same as in Alternative 3.

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Issue 4: Timber Supply and Sale Economics

This section analyzes the economic viability of the proposed timber sales. The project area contains large areas of steep terrain that are difficult to access. The cost of logging these areas and applying more difficult silviculture prescriptions to address resource concerns may reduce the economic viability of the proposal. There is also concern about the amount of timber available for sale from national forests and how the supply affects local employment and revenues.

NIC I and NIC II

The allowable sale quantity (ASQ) is divided into two non-interchangeable components (NIC's) based on economic factors. Timber harvest is easiest and most economical on NIC I lands. The NIC II lands are more difficult to harvest or access and therefore, less economical. The Forest Plan assumed about 80 percent of the ASQ would come from NIC I lands and the remaining 20 percent from NIC II lands (Forest Plan ROD, page 7). The volume of timber harvested from the two NIC components is tracked to monitor Forest Plan assumptions.

On the Cholmondeley Project Area, 38 percent of the commercial forest land (CFL) is classified as NIC I and 62 percent as NIC II. These percentages indicate that the project area is difficult to harvest and the financial efficiency of harvest may be low. Both NIC I and NIC II exist within individual harvest units. In all the action alternatives, 55 percent of the proposed harvest area is in NIC I and the remaining 45 percent is in NIC II. Table 3-1 displays the amount of NIC I and NIC II lands that would be harvested in Saltery Cove, Clover Bay, Sunny Cove, and the entire project area for each alternative. Alternative 4 proposes harvesting the same proportion of NIC I and NIC II as the other alternatives because the area of difficult and normal operating ground deferred from harvest is equal.

The terrain around Sunny Cove and Saltery Cove is more difficult to harvest than the terrain surrounding Clover Bay. Eighteen units are at financial risk because of their relatively low volume and high yarding costs. Eleven of these units are deferred in Alternative 4. The area in these units equates to 305 acres.

Table 3-1: Harvest in NIC I and II By Alternative and Location

	NIC	Existing Area (%)	Percent Harvest Area			
			Alt. 2	Alt. 3	Alt. 4	Alt. 5
Saltery Cove	I	28	38	38	38	38
	II	72	62	62	62	62
Clover Bay	I	46	72	73	85	72
	II	54	28	27	15	28
Sunny Cove	I	33	40	40	31	40
	II	67	60	60	69	60
Project Area	I	38	55	55	55	55
	II	62	45	45	45	45

Financial Efficiency

The financial efficiency analysis estimates future net revenues by comparing expected gross revenues to estimated costs. Forest Service policy and handbook direction (FSH 2409.18 Amend. 90-1 and Supp. 6) requires a financial efficiency assessment of each proposed timber sale project. Financial efficiency is measured by revenue/cost ratio and financial present net value (PNV). The revenue/cost ratio determines the most financially efficient alternative. The PNV identifies the degree an alternative contributes to an above-cost or below-cost program.

Revenue/Cost Ratio

Pond log value represents the delivered price of logs at the mill minus the cost of their manufacture. The alternatives are analyzed using both "high" and "low" market values because of the large fluctuations in recent markets. The low market pond value used in this analysis was derived from recent sale appraisals (Polk Inlet area) and information from previous mid-market analyses. The high market value is based on 1995 sales when timber prices were high.

Logging (stump-to-truck) costs vary by volume class due mainly to the size of the logs yarded. In general, the higher the volume per acre and the larger the logs, the lower the logging costs, measured in thousand board feet (MBF). Logging costs include costs of felling, bucking, yarding, sorting, and loading. Logging costs were estimated from the Regional average costs, recent appraisals, local project knowledge, field investigation, and professional knowledge.

Stumpage value is the potential return the Forest Service would receive for timber sold. Stumpage value was calculated for each alternative by subtracting estimated logging, transportation, and road construction costs from the pond log value. An allowance of 60 percent of the normal profit and risk was also included as a cost and subtracted from pond log values (Forest Service Handbook 2409.18). The stumpage value does not include bid premiums that could result from competitive bidding for the timber when sold. It does not include chip values or other value-added products. In an actual appraisal, each timber sale would add an appropriate chip value to the value per MBF. Recent appraisals have indicated this value is about \$200 per MBF.

Units 674-537, -538, -549, -551, -581, and 615-025 may be uneconomical to harvest in low-market conditions. These units require helicopter yarding to prevent damage to the residual stand and meet resource objectives. The area north of Monie Lake, Units 616-018, -019, -022, -023, and -024, would be uneconomical because the units require long roads to reach them and are relatively low volume per acre. Using helicopters to yard logs becomes very expensive if the average yarding distance (AYD) is near or exceeds 8,800 feet. Depending on the alternative, Units 614-002, -005, -034a, and -034b; 616-013, -016, -021, and -275; 675-030, -033, and -037; and 676-462, -472, -484, and -500 would be at risk for this reason. See Table 3-4 below for the breakdown of helicopter units by cost category.

A positive net stumpage value indicates a financially viable alternative. The low market analysis produced net stumpage values ranging from negative \$370 to positive \$60 per MBF (Table 3-2). Alternatives 2 and 3 would have negative stumpage values in low markets while Alternatives 4 and 5 would be positive. The high market analysis produced net stumpage values ranging from negative \$190 to positive \$240 per MBF (Table 3-2). Alternatives 2 and 3 have negative stumpage values while Alternatives 4 and 5 have positive stumpage values. Variation in net

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stumpage between alternatives is primarily due to the differing amounts of helicopter logging, the greatest amount being in Alternative 2. Alternative 4 has the highest stumpage values because the less economical helicopter units are deferred.

At lower market conditions those alternatives with lower or negative stumpage values have a greater risk of not being financially viable. The high development cost area north of Monie Lake were deferred in Alternative 4, which resulted in its relatively high stumpage value.

Table 3-2: Financial Efficiency Assessment

	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Total Volume (MBF)	35,165	33,378	23,371	35,165
Pond Log Value (\$) Per MBF (Low Market) ^{1/,4/}	370	370	370	370
Pond Log Value (\$) Per MBF (High Market) ^{1/,4/}	550	550	550	550
Logging Costs (\$) Per MBF	660	550	140	170
Transportation Costs (\$) Per MBF	20	20	30	30
Road Costs (\$) Per MBF ^{5/}	0	30	110	110
Direct Costs (\$) Per MBF ^{2/}	680	600	280	310
60% of the Nominal Profit and Risk of 15% (\$)	60	50	30	30
Net Stumpage Value (\$) ^{3/} Per MBF (Low Market)	-370	-280	60	20
Net Stumpage Value (\$) ^{3/} Per MBF (High Market)	-190	-100	240	210

1/ Pond log values: Low market is based on several Polk Inlet timber sales appraised in 1998, when markets were at a 30 year low; high market is based on 1st quarter 1995 values and average Forest-wide species composition.

2/ Direct costs = Total logging costs and total transportation

3/ Net stumpage value = Pond log value - total direct costs - (60% * 15%) (Profit and Risk)

4/ Does not include chip values (approximately \$200 per MBF)

5/ There is no roadbuilding in Alternative 2

Dollars are rounded to the nearest \$10.

Present Net Value

The Present Net Value analysis discounts the future benefits and costs to the initial year or the first year of investments. This provides a basis for comparing today's investment against future returns. Costs and management expenses are distributed on a per-acre basis and subtracted from stumpage values. These costs and management expenses include planning, sale preparation, harvest administration, reforestation, timber stand improvement, general and program administration, facilities depreciation, and regional landline location. The Present Net Values resulting from this analysis and displayed in Table 3-3 are relative comparisons between alternatives and do not represent actual values. This analysis does not reflect market fluctuations, competitive bidding, or changes in pond log values. The returns on investment are highest for Alternative 5 and lowest for Alternative 2.

Table 3-3: Public Investment Summary

	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Forest Service Revenues				
Volume (MBF)	35,165	33,378	23,371	35,165
Net Stumpage Value ^{1/} Per MBF (High Market) (\$)	-190	-100	240	210
Total Value (\$)	-6,681,350	-3,337,800	5,609,040	7,384,650
Forest Service Fixed Costs				
Acres	1,511	1,489	941	1,511
Pre-Harvest Costs (per acre) ^{2/} (\$)	1,554	1,554	1,554	1,554
Pre-Harvest Costs (\$)	2,348,094	2,313,906	1,462,314	2,348,094
Present Net Value (PNV) (\$)	-9,029,444	-5,651,706	4,146,726	5,036,556

1/ High market is based on 1st quarter 1995 values and average Forest-wide species composition.

2/ Forest Service costs include sale preparation, timber planning, silvicultural exams, harvest administration, general and program administration, facilities depreciation, and regional landline location. They are based on the Timber Sale Program information Reporting System (TSPIRS) for Fiscal Year 1994 for the former Ketchikan Area, Tongass NF.

Financial Efficiency by Sale

The volume harvested under each alternative would be combined into smaller sale areas (Figure 3-8). Helicopter yarding can change the economic viability of a timber sale. To isolate the factors that influence a timber sale's economic risk, a method was developed by Region 10 (Lunde and Simmons, 2000), which separates harvest units into logical groupings based on yarding distance. These groupings provide investment direction and display trade-offs associated with specific harvest units. This method uses Region 10 average helicopter yarding costs as its foundation. The regional average 'stump-to-truck' cost for helicopter yarding ranges from \$290 per MBF to \$310 per MBF, assuming an average yarding distance (AYD) of about 2,200 feet. This method of analysis assumes that 75 percent of the 'stump-to-truck' cost is directly related to flight distance. The information below addresses only the cost estimates associated with helicopter yarding distances.

- **2,200 feet AYD** – assumes an average cost of \$300 per MBF; 75 percent of this cost is related to flight distance ($300 \times 0.75 = \$225$).
- **4,400 feet AYD** – assumes an average cost of \$525 per MBF ($\$225 + \$225 + \75) [Note: the \$75 per MBF is for the 'stump-to-truck' cost not directly associated with the yarding costs explained above ($\$300 \times 0.25 = \75)].
- **6,600 feet AYD** – the adjusted cost would be \$750 per MBF.
- **8,800 feet AYD** – the adjusted cost would be \$975 per MBF.
- **More than 8,800 feet AYD** – the adjusted cost would be \$1,000 per MBF.

Table 3-4 displays the units in each helicopter yarding cost category by alternative.

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Table 3-4: Helicopter Units by MBF Cost Category for Each Alternative

Alternative	2,200 feet AYD (\$300/MBF)	4,400 feet AYD (\$525/MBF)	6,600 feet AYD (\$750/MBF)	8,800 feet AYD (\$975/MBF)	> 8,800 feet AYD (\$1,000/MBF)
2	615-025 616-010, -011, -022, -023, -024, -123 617-009 674-032, -537, -548, -549, -550, -551, -583 676-592	614-001a, -001b, -002 616-007, -018	616-008, -012, -017, -019 675-028, -029, -031, -032 676-489	616-013, -016, -021 675-030 676-462, -472, -484, -500	614-005, -034a, -034b 616-275 675-033, -037
3	615-025 616-011, -022, -023, -024, -123 674-032, -537, -548, -549, -550, -551, -583 675-033, -037 676-462, -472, -484, -489, -500, -592	616-007, -018 617-009	614-001a, -001b 616-008, -012, -017, -019 675-031, -032	614-002 616-013, -016, -021	614-005, -034a, -034b 616-275
4	614--005 675-033 676-462, -472, -484, -489, -500, -592	675-037	None	None	None

Table 3-4: Helicopter Units by MBF Cost Category for Each Alternative
(continued)

Alternative	2,200 feet AYD (\$300/MBF)	4,400 feet AYD (\$525/MBF)	6,600 feet AYD (\$750/MBF)	8,800 feet AYD (\$975/MBF)	> 8,800 feet AYD (\$1,000/MBF)
5	614-005	616-011	674-032, -537, -548, -549, -550, -551, -583	None	None
	615-025	675-037			
	616-019				
	675-033		675-031, -032		
	676-462, -472, -484, -489, -500, -592				

Stumpage values are greatly negative in low markets when the yarding method uses helicopters exclusively, as found in all sales for Alternatives 2 and 3 (Table 3-5). By contrast, the sales that use cable yarding methods have positive stumpage values (Table 3-5). Building roads in the "Cher" Timber Sale is not an option because of the rugged terrain and resource concerns. The resulting stumpage rates are negative in all alternatives. The sales with the shorter helicopter yarding distances tend to show the least negative values of the helicopter sales.

The different stumpage rates between the roaded and unroaded alternatives in high markets are dramatic. Mixing helicopter and cable systems in Alternative 3 results in slightly higher stumpage rates. However, these figures do not reflect the higher costs of restrictions to helicopter flights and the possibility of extending the logging period needed to get the volume out.

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Table 3-5: Financial Efficiency by Sale

Alternative 2 – Helicopter Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	8,229	5,115	6,632	7,592	7,598
Pond Log Value (\$) Per MBF (Low Market) ^{1/} , ^{4/}	370	370	370	370	370
Pond Log Value (\$) Per MBF (High Market) ^{1/} , ^{4/}	550	550	550	550	550
Logging Costs (\$) Per MBF	930	390	570	650	710
Transportation Costs (\$) Per MBF	20	10	20	10	20
Road Costs (\$) Per MBF ^{5/}	0	0	0	0	0
Direct Costs (\$) Per MBF ^{2/}	950	400	590	670	730
60% of the Nominal Profit and Risk of 15% (\$)	80	40	50	60	60
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	-660	-70	-270	-360	-410
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	-480	110	-90	-180	-230

Alternative 3 – Helicopter Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4,602	5,115	6,632	5,804	7,598
Pond Log Value (\$) Per MBF (Low Market) ^{1/} , ^{4/}	370	370	370	370	370
Pond Log Value (\$) Per MBF (High Market) ^{1/} , ^{4/}	550	550	550	550	550
Logging Costs (\$) Per MBF	300	390	570	690	890
Transportation Costs (\$) Per MBF	20	10	20	10	20
Road Costs (\$) Per MBF	50	0	0	0	0
Direct Costs (\$) Per MBF ^{2/}	370	400	580	700	910
60% of the Nominal Profit and Risk of 15% (\$)	30	40	50	60	80
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	-30	-70	-260	-390	-620
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	150	110	-80	-210	-440

Table 3-5: Financial Efficiency by Sale (continued)

Alternative 3 – Cable Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4174	0	0	0	0
Pond Log Value (\$) Per MBF (Low Market) ^{1/, 4/}	370	N/A	N/A	N/A	N/A
Pond Log Value (\$) Per MBF (High Market) ^{1/, 4/}	550	N/A	N/A	N/A	N/A
Logging Costs (\$) Per MBF	80	N/A	N/A	N/A	N/A
Transportation Costs (\$) Per MBF	10	N/A	N/A	N/A	N/A
Road Costs (\$) Per MBF	100	N/A	N/A	N/A	N/A
Direct Costs (\$) Per MBF ^{2/}	190	N/A	N/A	N/A	N/A
60% of the Nominal Profit and Risk of 15% (\$)	30	N/A	N/A	N/A	N/A
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	150	N/A	N/A	N/A	N/A
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	230	N/A	N/A	N/A	N/A

Alternative 4 – Helicopter Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4602	0	0	430	937
Pond Log Value (\$) Per MBF (Low Market) ^{1/, 4/}	370	N/A	N/A	370	370
Pond Log Value (\$) Per MBF (High Market) ^{1/, 4/}	550	N/A	N/A	550	550
Logging Costs (\$) Per MBF	300	N/A	N/A	300	300
Transportation Costs (\$) Per MBF	20	N/A	N/A	10	10
Road Costs (\$) Per MBF	50	N/A	N/A	150	90
Direct Costs (\$) Per MBF ^{2/}	370	N/A	N/A	460	400
60% of the Nominal Profit and Risk of 15% (\$)	30	N/A	N/A	20	20
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	-30	N/A	N/A	-110	-50
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	150	N/A	N/A	70	130

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Table 3-5: Financial Efficiency by Sale (continued)

Alternative 4 – Cable Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4604	0	0	7783	6928
Pond Log Value (\$) Per MBF (Low Market) ^{1/, 4/}	370	N/A	N/A	550	550
Pond Log Value (\$) Per MBF (High Market) ^{1/, 4/}	550	N/A	N/A	370	370
Logging Costs (\$) Per MBF	90	N/A	N/A	80	90
Transportation Costs (\$) Per MBF	20	N/A	N/A	20	20
Road Costs (\$) Per MBF	100	N/A	N/A	150	90
Direct Costs (\$) Per MBF ^{2/}	210	N/A	N/A	250	200
60% of the Nominal Profit and Risk of 15% (\$)	30	N/A	N/A	20	20
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	130	N/A	N/A	100	150
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	310	N/A	N/A	280	330

Alternative 5 – Helicopter Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4602	5115	1478	448	943
Pond Log Value (\$) Per MBF (Low Market) ^{1/, 4/}	370	370	370	370	370
Pond Log Value (\$) Per MBF (High Market) ^{1/, 4/}	550	550	550	550	550
Logging Costs (\$) Per MBF	300	390	300	300	300
Transportation Costs (\$) Per MBF	20	10	20	10	20
Road Costs (\$) Per MBF	50	0	190	150	90
Direct Costs (\$) Per MBF ^{2/}	370	400	510	460	410
60% of the Nominal Profit and Risk of 15% (\$)	30	40	30	20	20
Net Stumpage Value ^{3/} (\$) Per MBF (Low Market)	-30	-70	-170	-110	20
Net Stumpage Value ^{3/} (\$) Per MBF (High Market)	150	110	10	70	200

Table 3-5: Financial Efficiency by Sale (continued)

Alternative 5 – Cable Only:

	Sunny	Cher	N. Monie	S. Monie	Saltery
Total Volume (MBF)	4604	0	5900	7763	6968
Pond Log Value (\$ Per MBF (Low Market))^{1/}	370	N/A	370	370	370
Pond Log Value (\$ Per MBF (High Market))^{1/}	550	N/A	550	550	550
Logging Costs (\$ Per MBF)	90	N/A	80	80	90
Transportation Costs (\$ Per MBF)	10	N/A	20	10	20
Road Costs (\$ Per MBF)	100	N/A	190	150	90
Direct Costs (\$ Per MBF)^{2/}	200	N/A	290	240	200
60% of the Nominal Profit and Risk of 15% (\$)	30	N/A	30	20	20
Net Stumpage Value^{3/} (\$ Per MBF (Low Market))	140	N/A	50	110	150
Net Stumpage Value^{3/} (\$ Per MBF (High Market))	320	N/A	230	290	330

^{1/} Pond log values: Low market is based on several Polk Inlet timber sales appraised in the last year; high market is based on 1st quarter 1995 values and average Forest-wide species composition.

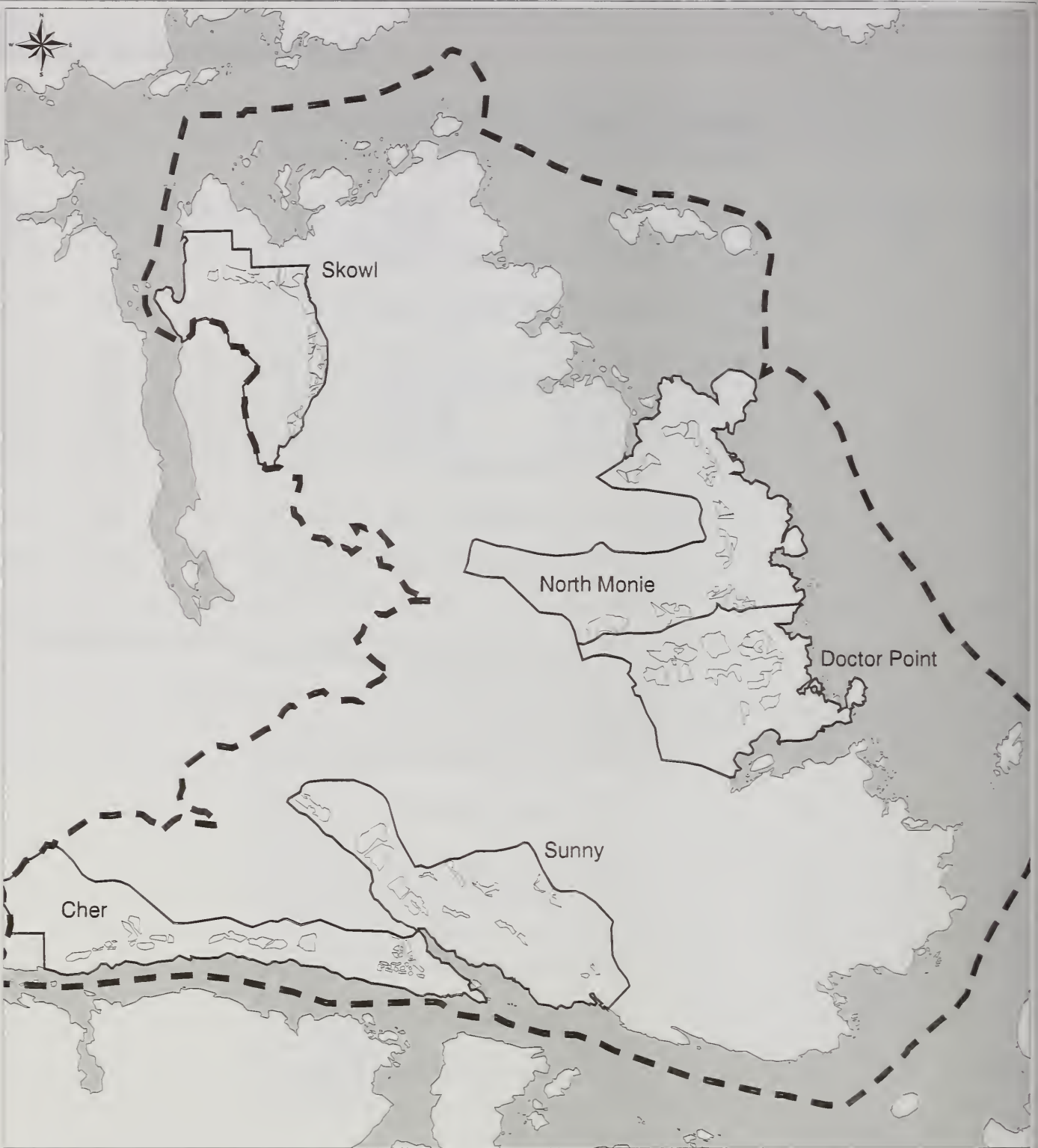
^{2/} Direct costs = Total logging costs and total transportation.





^{3/} Net stumpage value = Pond log value – total direct costs – (60% x 15%) (profit and risk).

^{4/} Does not include chip values (approximately \$200 per MBF)

^{5/} No road building is included in Alternative 2.

All Numbers (excluding volumes) are rounded to the nearest \$10.



-  Saltwater
-  Project Boundary
-  Proposed Unit
-  Proposed Sale Area

2 0.0 2 miles

CHOLMONDELEY
DEIS

November 2000
Proposed
Sale Areas

Figure 3-8

Timber Workforce

Employment and income generated by timber harvest are estimated using employment data from Southeast Alaska and correlation between timber volume, jobs, and income (Forest Plan; page 3-480). Employment factors used in this analysis were 1.95 logging jobs/MMBF and 3.33 sawmill jobs/MMBF. We assumed that the pulp log component would be chipped or otherwise manufactured at the sawmill site for transport out of the region. Therefore, the employment effects for each alternative are estimated as the sum of logging and sawmill jobs per MMBF multiplied by the planned harvest volume (e.g. Alternative 2: $(1.95+3.33) \times 39.9 = 211$ employees). These estimates represent the total employment and income generated over the period of activities (one to five years from road building to timber harvest activity) in the project area. We used the average earning estimate of \$47,437 (adjusted to 1998 dollars) as direct earnings generated in Southeast Alaska (Forest Plan, page 3-479). Alternative 5 would generate the most logging-related employment and earnings (Table 3-6). This is followed by Alternatives 2, 3, and 4 respectively. A higher harvest results in more timber harvest-related jobs and earnings. Additional secondary impacts would also occur in supplier/service communities for logging and sawmill operations.

We did not assess timber harvest-related employment and earnings that accrue directly to communities in and around the project area. Residents in small communities tend to take advantage of new jobs available in their vicinity. We expect that local people would fill some of the jobs or support services. In general, timber harvest-related jobs tend to be seasonal (April through October), and last for a limited time (one to five years). However, the offerings may be an important source of wood supply for the existing mills and logging operations and help to maintain the capital investment already in place in several communities.

Table 3-6: Wood Products Related Employment and Earnings By Area

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Saltery Cove					
Volume (mmbf)*	0	7.6	6.6	7.9	7.9
# of Jobs	0	40	35	42	42
Earnings (\$mm)	0	1.90	1.66	1.99	1.99
Clover Bay					
Volume (mmbf)*	0	14.2	13.8	8.2	15.6
# of Jobs	0	75	73	43	82
Earnings (\$mm)	0	3.56	3.46	2.04	3.89
Sunny Cove					
Volume (mmbf)*	0	13.4	13.3	8.6	13.8
# of Jobs	0	71	70	45	73
Earnings (\$mm)	0	3.32	3.32	2.13	3.46
Total					
Volume (mmbf)*	0	35.2	33.8	24.7	37.3
# of Jobs	0	186	178	130	197
Earnings \$mm	0	8.78	8.44	6.16	9.34

* Includes ROW volume

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Small Sale Opportunities

The timber volumes proposed in the alternatives would be offered in more than one sale. Sales would range in size from 5 to 13 MMBF. The larger sales are relatively isolated with no existing roads. There may be opportunities for micro-sales (less than one million board feet) in the future should salvage of blowdown be necessary. The estimated number of potential sales is between three and five depending on the selected alternative (Table 3-7). Alternatives with higher volumes have more flexibility to possibly offer smaller sales. However, due to the economics of helicopter-yarded sales, Alternative 3 would be more economical to offer in one large sale for all the volume north of Clover Bay.

Table 3-7: Numbers and Sizes of Sales by Alternative

	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Maximum Number of Sales	5	5	3	5
Smallest Offering (MMBF)	5.1	5.1	7.6	5.1
Largest Offering	8.2	13.8	8.2	8.2
Average Sale Size	7.0	6.7	7.8	7.0

Issue 5: Roadless Character

The Cholmondeley Project Area is located on the eastern two-thirds of the 84,000-acre McKenzie Roadless Area (Number 519). The project area covers about 63 percent of this roadless area (Chapter 1, page 1-3). A recent update shows the roadless area is currently 79,295 acres.

To be considered wilderness, an area must have more than 5,000 acres of undeveloped land or not contain improved roads maintained for travel by passenger type vehicles (1964 Wilderness Act). Once an area has roads, it is generally no longer available for wilderness consideration. To define a roadless area, a 600-foot buffer is applied to any roads, groups of harvest units, or other man-created disturbances. The area outside these buffers is defined as "roadless" as long as it is part of a parcel of at least 5,000 contiguous acres. The McKenzie Roadless Area exceeds the minimum wilderness criteria.

All alternatives except the No Action Alternative reduce to some extent the size of the McKenzie Roadless Area. The roadless area remaining after timber harvest would extend from Spiral Cove and Kluanil Cove in the north to the northwest shore of Cholmondeley Sound. The roadless area is in the interior of the project area and is an area of rugged terrain and lake basins. This area would be eligible for future considerations as wilderness, regardless of the action alternative chosen.

Values associated with roadless areas include reference research areas, barrier areas, aquatic strongholds, and ecological sustainability. Several Research Natural Areas were established during the Forest Plan revision explicitly for this purpose. Other non-development areas, such as Semi-remote Recreation, Primitive Recreation, Special Interest Areas, and Wilderness also provide the opportunity for baseline monitoring. See Cumulative Effects below.

Roadless areas can provide safeguards against invasive, noxious or exotic pest or weed species. No pest or weed species are currently posing a major problem to native species in the project area.

Long-term ecological sustainability is discussed in great detail in the Old-growth Forest section. The Old-growth Reserve system developed in the Forest Plan was developed in part to provide ecological sustainability throughout the forest.

Aquatic strongholds for fish of recreational, subsistence, and commercial value are discussed in the Fisheries, Recreation, and Subsistence sections. Scenery and character are discussed under the Significant Issues and Recreation sections.

Alternative 1

The McKenzie Roadless Area remains at 79,295 acres.

Alternative 2

The McKenzie Roadless Area is reduced to 73,073 acres.

Alternative 3

The McKenzie Roadless Area is reduced to 72,981 acres.

Alternative 4

The McKenzie Roadless Area is reduced to 75,246 acres.

Alternative 5

The McKenzie Roadless Area is reduced to 72,528 acres.

For the most part, this roadless area is surrounded by private or national forest lands that have been subject to moderate to heavy levels of timber harvest and roading. Nearby roadless areas just beyond these developed areas are the Karta River Wilderness to the northwest, a small roadless area on Kasaan Peninsula (7,593 acres) to the north, and the Eudora Roadless Area (195,884 acres) and the Nutkwa LUD II Area (52,961 acres) to the south.

Cumulative Effects

The McKenzie Roadless Area has been reduced by 6 percent since 1979. This project would further reduce it by 5-9 percent. Since this harvest entry is expected to be the only entry in the foreseeable future, we do not expect this portion of the McKenzie Roadless Area to be reduced further.

Other Environmental Considerations

Several resources and uses of the project area are likely to remain unaffected by the proposed action or alternatives, or would not be affected to a significant degree. Even though significant effects are not anticipated, most of these resources are discussed in this chapter to the extent that measurable effects or differences between alternatives are present.

Silviculture

The Silviculture analysis is summarized from the Silviculture and Timber Management Resource Report for the Cholmondeley Project Area, 1998 (project file). This report includes details on stand development, silvicultural and harvest systems, long-term timber productivity, wind effects, timber supply, reconnaissance procedures, volume strata, forest land classifications, forest health, and economic analysis.

Affected Environment

The project area contains approximately 52,772 acres. About 132 acres were previously harvested but are not available for future entry. Thirty-two of these acres are included in Native or State land conveyances. The other 100 acres are included in the beach fringe and are not available for timber harvest.

The Cholmondeley Position Statement (project file) concluded that the project area contained three areas of concentrated volume intermixed with scattered low-volume stands that are difficult to access. Old-growth reserves and beach buffers are not available for timber harvest (Forest Plan, 1997). Very high hazard soils, steep slopes, and riparian areas were identified as unsuitable for timber harvest during field reviews. Approximately 4,440 acres of suitable and available timber remain. Of this area, 2,153 acres are NIC I and 2,287 acres are NIC II (Silviculture Report, project file). These areas of suitable and available timber are scattered across the project area. The timber volume in some of these areas does not support the cost of access. Thus, lack of economical access further limits the area of actual timber harvest.

Silvicultural diagnoses and prescriptions propose structural retention for resource needs other than timber. The project area occurs within a high-risk biogeographic province and less than 33 percent of each VCU has been harvested. Standards and guidelines for marten habitat were applied to units with high value marten habitat (Forest Plan, 1997). Goshawk standards and guidelines were not applied since less than 33 percent of each VCU has been harvested.

Volume Estimates

The commercial forest land is divided into three strata – high, medium, and low – to derive volume estimates (Forest Plan FEIS, page 3-19). These strata are based on timber type information, soil and land classifications, and topography. Volume estimates on the southern area of the Tongass National Forest are:

14 MBF/acre - low-volume strata

23 MBF/acre - medium-volume strata

30 MBF/acre - high-volume strata.

The percent of the commercial forest land in the low, medium, and high strata on the Cholmondeley Project Area is 13, 51, and 36 percent, respectively (Table 3-8).

Silviculture Systems

The silvicultural prescriptions for the harvest units address the variety of stand conditions and resource issues. These prescriptions include even-aged, two-aged, and uneven-aged systems (Forest Plan FEIS, Appendix G). The choice of systems depends on the resource objectives for the units. Resource objectives include desired species composition, stand density, growth rate, insect and disease control, and overstory condition and development.

Even-aged System. This system produces stands that are essentially the same age and include clearcut, seedtree and shelterwood harvest methods (with or without reserves). Clearcut with natural regeneration is the most commonly used system on the Tongass National Forest. Clearcut harvest is essential to meet the Forest Plan Resource Schedule (Forest Plan, Appendix L). It is justified because it reduces potential adverse effects such as disease infestations (mistletoe), windthrow, and logging damage. It also enhances regeneration and growth of desired shade-intolerant tree species (Silviculture and Timber Report, project file).

Even-aged systems in this analysis include reserves, leaving some (less than 15 percent) of the original stand on the site. The residual structure would be left on the site in perpetuity, and would retain some of the original biological components in the developing stands. Even-aged systems are easiest to implement and provide the most volume for the least expense.

Even-aged systems have the most visual impact of the harvest systems. Clearcut harvest methods are used on the Cholmondeley Project Area to enhance regeneration potential and the economic return on harvest. Clearcutting is only used when the VQO's can be met, soils and slopes are stable, and wildlife and streams are not unduly impacted (Appendix B). Reserve trees can be incorporated into clearcuts by four basic methods: Type A, Type B, Type C, and Type D (Silviculture and Timber Report, project file). Type A clearcuts leave safe snags and nonmerchantable reserve trees within 50 to 100 feet of the harvest unit edges. Non-merchantable trees are also left near internal boundaries if loggers' safety is assured. Trees are directionally felled toward the landing to prevent damage to the reserve trees, and yarded out of the buffer. Type B clearcuts are similar to Type A, except a specified number of snags and live tree replacements of a minimum diameter are retained in the 50- to 100-foot border. Live reserve trees may only be required in stream buffers because the unit boundaries can be adjusted around the reserve. Type A and B clearcuts are practical for implementation with cable yarding. Type C clearcuts would leave nonmerchantable trees and safe snags over the entire unit. This type of clearcut can be used with helicopter yarding. Type D clearcuts would provide clumps of reserve trees in islands or fingers within the unit. This type can be implemented where rock outcrops, cliffs, or blind leads make harvesting uneconomical or infeasible. Clumps of reserve trees can also be left in other areas if helicopter yarding or cable yarding with lateral yarding capability is the logging system to be employed. A Type D clearcut can be prescribed by itself or in combination with one of the other three types.

Two-aged System. This system is designed to regenerate or maintain stands with two age classes. Two-aged stands in this analysis retain a portion (more than 15 percent) of the original stand. Trees are left in clumps and/or scattered individually over the site. Two-aged systems have some of the advantages of even-aged systems and retain more of the original stand complexity. Specifically, a two-aged system is prescribed as part of the biological matrix to address wildlife needs. Visually sensitive areas also benefit by the additional tree retention. High winds may blow down some

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of the residual trees. Leaving the trees in clumps would reduce the potential for windthrow.

Harvest systems must meet criteria for tree retention, tree distribution, and size of openings created in the units to qualify as a two-aged management system. Reserve trees are left in perpetuity and create the two-structured stand. The criterion for tree retention is to leave more than 15 percent of the unit volume standing in the unit (memo, Tom Puchlerz, April 5, 2000). The reserve trees address wildlife corridor, marten habitat, and soil protection requirements. The distribution of reserve trees can be in clumps or scattered throughout the units. Clumps of reserve trees must be more than two tree lengths apart. Clumps of reserve trees are at least 100 feet across and allow for 200-foot-wide openings. Trees left in openings must be more than one tree length away from a clump or unit edge (memo, Tom Puchlerz, April 5, 2000). Reserve trees scattered throughout the unit must be within one mature tree length of each other. The sizes of the openings are as wide as about two tree heights. Linear openings may be less than twice the mature tree height on their shortest axis but exceed twice the height on the long axis.

Uneven-aged System. Uneven-aged systems regenerate and maintain a multi-aged stand structure by removing some trees from all size classes either singly, in small groups, or in strips. Uneven-aged management maintains or creates a stand with three or more distinct age classes. The density of the overstory is regulated to avoid suppression of the understory trees and maintain stand vigor. Uneven-aged systems retain the highest structural diversity and biological complexity of the original stand. It is generally a favorable system for shade-tolerant species like western hemlock.

Even-aged and two-aged systems mimic large-scale disturbance such as might result from windstorms, landslides, or avalanches. Uneven-aged systems mimic small-scale disturbance such as individual tree blowdown. Site conditions influencing the choice of system include species composition, stand density, growth rate, insect and disease virulence, overstory condition, soil type, and topography.

Log Yarding

Yarding logs is the process of moving logs from the stump to the collection area or landing. The full spectrum of methods is used depending on access, topography, resource protection requirements, and costs. Yarding methods include ground-based equipment, cable systems, and helicopters. Ground-based systems are used on gentle terrain and logs are in full contact with the ground. They are the least expensive of the yarding systems and cost about \$79 per MBF. These systems have limited utility on the Cholmondeley Project Area due to the steep terrain. They are most often used adjacent to roads. Cable systems are used on steep slopes and wet soils. Logs can be partially or fully suspended off the ground, which limits soil disturbance. Running skyline and slackline cable systems are the most commonly used systems and provide partial log suspension. Live skyline is another cable system that provides full log suspension. The average cost of all types of cable systems is \$152 per MBF. Helicopter yarding allows logs to be lifted off the ground, which causes the least ground disturbance, or damage to the trees left standing on the site (residual trees). Helicopter flight time costs between \$2,000 and \$5,000 per hour and averages about \$315 per MBF. Factors that affect flight time include elevational differences between stump and landing, logs or volume per acre, species mix and value, payload capabilities of the aircraft, and water versus road drop points.

Post-Harvest Silvicultural Treatments

Post-harvest silvicultural treatments would be prescribed to move the project area further towards desired future conditions. The type of treatment would depend on land use classification, slope, soils, aspect, elevation, resource objectives, and economic feasibility. Pre-commercial thinning is anticipated in 15 to 30 years on some of the units proposed for harvest in this project area. Commercial thinning is anticipated in 25 to 40 years. Unit prescriptions would guide silvicultural treatment planning and field verification would identify priority treatment areas (Silviculture Report, project file).

Direct and Indirect Effects

In Alternatives 2 and 5, 35 percent of the area harvested is in the high-volume strata, 56 percent is in the medium-volume strata, and 9 percent is in the low-volume strata. The distribution of harvested area across the volume strata is similar for Alternative 3 except it decreases by 1 percent in the high-volume strata and increases by 1 percent in the medium-volume strata. Under Alternative 4, 42 percent of the area harvested is in the high-volume strata, 54 percent is in the medium-volume strata, and 4 percent is in the low-volume strata. Eight percent of the total commercial forest land is harvested under Alternatives 2, 3, and 5, and five percent is harvested under Alternative 4. There is little change in the distribution of commercial forest land across the volume strata from the existing condition (Table 3-8).

Table 3-8: Percent of Commercial Forest Land Remaining After Harvest, by Volume Strata

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Low-volume Strata (%)	13	13	13	13	13
Medium-volume Strata (%)	52	46	46	48	46
High-volume Strata (%)	35	33	33	34	33

Source: USDA Forest Service, Tongass GIS

The initial volume estimates derived from the volume strata were adjusted using aerial photograph interpretation and field verification during alternative development (Silviculture Report, project file). The expected volume estimates for each value comparison unit are displayed in Table 3-9.

Proposed harvest units range from 5 to 106 acres. Two units, 614-001 and 675-033, exceed 100 acres. The actual opening size created in these units is somewhat less due to the expanded riparian buffers, varying densities of reserve trees, inclusions of sensitive soils or steep slopes that would not be harvested, and use of multiple silvicultural systems within the units. All proposed harvest units are expected to be regenerated within 5 years (36CFR 219.27(c)). Some sites may need fill-in planting of yellow cedar to maintain species diversity.

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Table 3-9: Proposed Harvest Volumes (MBF) by VCU

VCU	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
614	0	7,598	6,112	7,598	7,598
615	0	1,042	1,042	0	1,042
616	0	12,968	12,572	7,378	12,968
617	0	214	214	214	214
674	0	3,933	3,933	0	3,933
675	0	8,350	8,350	7,168	8,350
676	0	1,060	1,060	1,060	1,060
Total Unit Volume	0	35,165	33,283	23,418	35,165
Right-of-Way	0	0	437	934	1,680
Total Volume	0	35,165	33,720	24,352	36,845

USDA Forest Service, Tongass GIS

Table 3-10: Silvicultural Systems (Acres) By Alternative

Silvicultural System	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Uneven-aged	0	60	60	39	60
Even-aged	0	1,329	1,041	817	1,329
Two-aged	0	122	388	85	122
Total Acres	0	1,511	1,489	941	1,511

USDA Forest Service, Tongass GIS

Table 3-11: Acres by Logging System by Alternative

Yarding Type	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Running Skyline	0	0	74	456	538
Slackline	0	0	60	168	268
Helicopter	0	1,511	1,355	224	530
Live Skyline	0	0	0	4	73
Shovel	0	0	0	89	102
Total Acreage	0	1,511	1,489	941	1,511

USDA Forest Service, Tongass GIS

The silvicultural and yarding systems proposed in the alternatives are displayed in Tables 3-10 and 3-11, respectively. Alternatives 2 and 5 harvest the most suitable and available area (34 percent), followed closely by Alternative 3. Alternative 4 harvests 21 percent of the suitable and available area.

Wildlife

The Forest Plan contains a comprehensive conservation strategy to assure long-term species viability (Forest Plan FEIS, pages 3-11 through 3-26 and Appendix N). The Forest Plan ROD (1999) incorporated additional project-level standards and guidelines to strengthen species' protection. Both the conservation strategy and the additional ROD standards and guidelines are incorporated by reference in this analysis.

Many wildlife species depend on mosaics of unproductive and productive old-growth and late successional forest conditions. The conservation strategy provides a network of old-growth reserves to provide for these species. Connections between these tracts of forest are an important component in the conservation strategy adopted by the Forest Plan (Forest Plan FEIS, 1997).

The location, density, and use of roads have an effect on the quality of wildlife security habitat for certain species. Roads can affect dispersal patterns for low-mobility species such as invertebrates, amphibians, and some small mammals. Roads can increase human access to game and fur-bearing animals, including wolves.

Wildlife Habitat: Old-growth Forest

Old-growth forests are ecosystems distinguished by stands containing old, large trees and related structural attributes (Forest Plan FEIS). Old growth encompasses the later stages of stand development, which typically differ from earlier stages in a variety of ways: larger tree sizes and more variation in size and spacing; large, dead standing or fallen trees; broken or deformed tops, bole and root decay; multiple canopy layers; and canopy gaps and understory patchiness (Forest Plan FEIS). The combination of a dense canopy with scattered small openings (20 to 40 feet across) provides thermal cover and maintains deer forage availability through winter. Large, dead or defective trees provide nesting sites for martens, owls, eagles, wrens, and chickadees, as well as feeding sites for woodpeckers, sapsuckers, brown creepers and others. Large old-growth blocks provide expansive hunting territories, protection from predators, and promote genetic mixing among populations.

The old-growth forest resource of the Tongass National Forest is characterized in a number of ways. In a very general way, old-growth forests are divided into a productive or unproductive category, based on the ability to grow wood fiber at a rate greater than 20 cubic feet per acre per year (Forest Plan FEIS). Productive old-growth forest (POG) is divided into three volume strata: high, medium, and low. High-volume old-growth forest strata provide moderate levels of understory vegetation but superior snow interception. Thus, forage is readily available to deer during winter (Forest Plan FEIS, page 3-19). The more open canopy of the medium-volume old-growth forest strata results in a more abundant understory but less snow interception in the winter. Forage in the low-volume strata is unavailable in the winter when snow levels are deep because there is little forest canopy to intercept snow.

Affected Environment

The Cholmondeley Project Area is in the southeast part of the North Central Prince of Wales Island Biogeographic Province #14 (Forest Plan FEIS, 1997). Twenty-four percent of the old-growth forest has been harvested in this ecological province between 1954 and 1995 (Forest Plan FEIS, 1997). Approximately 132 acres of old-growth forest was harvested in the project area. There is currently a total of 17,116 acres of productive old-growth forest in the project area, of which about 6,487 acres is high-volume old-growth forest.

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The natural distribution of productive old-growth forest on the Cholmondeley Project Area is patchy and fragmented by muskeg, fens, scrub-shrub wetlands, forested wetlands, alpine shrub lands, lakes and ponds (Figure 2-1). Five blocks of old-growth forest are larger than 1,000 acres. These blocks are located in the Sunny Cove, Monie Lake and Saltery Cove watersheds, and along the West Arm of Cholmondeley Sound. Most patches of productive old-growth forest are in the 1- to 25-acre (143 blocks) category. There are also 49 blocks in the 26- to 100-acre category, 15 blocks in the 101- to 500-acre category, and three blocks in the 501- to 1,000-acre category.

The conservation strategy of the Forest Plan is designed to maintain well-distributed viable populations across the Tongass National Forest (Forest Plan ROD, page 51). Population viability is not assessed at the project level; however, project-level contributions to the Forest-wide strategy are considered. Low-elevation passes, beach fringe, and stream corridors provide natural connections between forested blocks and are important areas for migrating and dispersing wildlife. Corridors can be protected by not harvesting within them or by managing the matrix of habitat between the reserves (Suring et al., 1992). Both of these strategies are components of the conservation strategy and are reflected in the Forest Plan standards and guidelines (Forest Plan ROD, page 52). The ID team, with assistance from interagency biologists, reviewed the system of old-growth reserves and recommended boundary changes. They considered non-development LUD's, Forest Plan standards and guidelines for development LUD's, beach and estuary fringe, and riparian areas as they influence landscape connectivity within the Cholmondeley Project. The harvest prescriptions for the Cholmondeley Project all retain some of the original stand components. Safe snags and 10 percent of the overstory would be retained in clearcuts. Two-age and uneven-age systems are used to varying extents in each alternative. These systems are expected to maintain some of the original old-growth forest legacy. Landscape level fragmentation is limited by the system of old-growth reserves, non-development LUD's, beach and estuary fringe, and riparian buffers (Forest Plan ROD, page 52).

Wildlife species dependent on large, contiguous tracts of old-growth forest, such as marten, Prince of Wales flying squirrel and the Queen Charlotte goshawk, are negatively affected by the reduction of interior habitat and disruption of travel corridors between quality habitat. Interior-dependent species usually require a minimum of 300 feet from an edge (Forest Plan FEIS, page 3-24). Therefore, to be effective, corridors must be more than 600 feet wide. The area north of Monie Lake and south of Trollers Cove is an important travel corridor for wildlife species.

Direct and Indirect Effects

Approximately 9 percent of the POG would be harvested in the Cholmondeley Project Area under Alternatives 2, 3, and 5 (Table 3-12). Alternative 4 would harvest 5 percent of the POG, leaving intact the POG on the north side of West Arm and north of Monie Lake.

Table 3-12: Old Growth Harvested (Acres) in Each Alternative

	Acres Harvested				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
High-volume Strata (% of strata)	0	531 (36)	531 (36)	391 (42)	531 (36)
Medium-volume Strata (% of strata)	0	844 (51)	823 (55)	509 (54)	844 (51)
Low-volume Strata (% of strata)	0	136 (13)	135 (9)	41 (4)	136 (13)
Total Harvest (%)	0	1,511 (9)	1,489 (9)	941 (5)	1,511 (9)

Timber harvest in the Cholmondeley Project Area generally takes place in areas of consolidated commercial forest. These are also the larger blocks of old-growth forest, which leads to habitat fragmentation. Alternatives 2, 3, and 5 have similar fragmentation effects (Table 3-13). The number of patches greater than 1,000 acres would decrease by one in these alternatives and the average patch size would decrease by 15 percent. There would be a 56-59 percent increase in the number of patches in the smallest size class. Under Alternatives 2 and 5 the total area in the small patch size increases by 214 acres. Total area of the small patches in Alternative 3 increases by 220 acres. The average patch size decreases to eight acres in these alternatives (Table 3-14). In Alternatives 2, 3, and 5, the total area in the largest patch size class would decrease by about 3,600 acres (Table 3-14). There is basically no difference in the number of patches between alternatives in the middle size classes.

The number of old-growth forest patches in the largest size class would not change from current conditions under Alternative 4 though the total area would decrease about 1,622 acres. This area decrease is represented as a 15-percent decrease in average patch size. The number of patches in the smallest size class would increase by 32 percent. The total area in the smallest size class would increase by 64 acres but average patch size would decrease by two acres (Table 3-14).

Table 3-13: Number of Old-growth Patches by Size Class in Each Alternative

Patch size (acres)	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
0-25	143	227	224	189	227
26-100	49	49	48	46	49
101-500	15	15	15	12	15
501-1,000	3	5	5	4	5
1,000+	5	4	4	5	4

Table 3-14: Acres of Old Growth by Patch Size Class and Average Patch Size for Each Alternative

Patch Size (acres) (Average patch size)	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
0-25 (Average patch size)	1,579 (11)	1,799 (8)	1,793 (8)	1,643 (9)	1,799 (8)
26-100 (Average patch size)	2,199 (45)	2,189 (45)	2,202 (46)	2,087 (45)	2,189 (45)
101-500 (Average patch size)	2,903 (194)	3,271 (218)	3,267 (218)	2,431 (203)	3,271 (218)
501-1,000 (Average patch size)	2,109 (703)	3,390 (678)	3,444 (689)	2,588 (647)	3,390 (678)
1,000+ (Average patch size)	11,151 (2,230)	7,545 (1,886)	7,554 (1,889)	9,529 (1,906)	7,545 (1,886)

Forest fragmentation is greatest in Alternatives 2, 3, and 5. Alternative 4 would result in the least forest fragmentation because it has the smallest increase in the number of old-growth patches and the smallest decrease in maximum patch size. The largest unit is 105 acres in size and it is harvested in all action alternatives (Table 3-15). Increased forest fragmentation, the reduction of old-growth forest patch size, is generally considered detrimental to species that require old-growth forest habitat for survival and reproduction. Fragmentation tends to isolate old-growth dependent species of low mobility, thereby increasing their susceptibility to local population extirpation. Other species may become more susceptible to predation or nest parasitism.

Table 3-15: Harvest of Productive Old Growth on the Cholmondeley Project Area

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of units	0	44	43	26	44
Size range	0	3-105	3-105	5-105	3-105
Acres harvested	0	1,511	1,489	941	1,511
POG harvested (acres)*	0	1,428	1,406	889	1,428
1954 POG harvested (%)	0	7	7	5	7
Miles of road	0	0	5	19	26

SOURCE: GIS database

* The acres of POG harvested appear to be less than the total acres harvested due to coding differences in the GIS database. All acres harvested would be POG.

Maintaining wildlife habitat connectivity between the medium and small old-growth reserves would contribute to the effectiveness of the reserves by fostering population (and genetic) interchange of old-growth species between the reserves. Corridors may also provide additional predator escape/avoidance options. The medium reserve in VCU's 617 and 676 are connected to the small reserves in VCU's 616 and 615 by beach buffers. Unit 615-025 is located in a wildlife corridor between Clarence Strait and Trollers Cove. Ten percent of the overstory would be left throughout the unit and additional trees would be left in the western half of the unit. Riparian buffers would also provide forested connections between the old-growth reserves. No timber harvest occurs in this wildlife corridor under Alternative 4.

Old-growth Reserves

The Cholmondeley Project Area contains one small Old-growth Habitat Reserve (OGR) in each VCU (Figure 3-9). The OGR's in two VCU's are combined to form a medium reserve. The Forest Plan provides for evaluation and adjustments of small OGR's during project level environmental analysis to meet or exceed the minimum reserve criteria (Forest Plan, page 3-82 and Appendix K, page K-2). Small reserves should be at least 16 percent of each VCU and 50 percent of this area should be productive old-growth forest (Forest Plan, Appendix K, page K-1).



An interagency team of biologists from the Forest Service, Alaska Department of Fish and Game, and Fish and Wildlife Service evaluated the small OGR's in the project area. The reserves were assessed for size, spatial location, connectivity, and biological function (Biodiversity and Old Growth Report, project file). Based on this assessment, the following OGR boundary changes are recommended for VCU's 614, 616, and 675. The small OGR modifications are included on the alternative maps and summarized in Table 3-16. These changes could apply to any alternative if the Deciding Officer concurs.

Sunny Cove (VCU 675). The size of the small Old-growth Reserve in Sunny Cove, as mapped in the Forest Plan, is 2,545 acres with 1,083 acres of POG. This OGR is more than twice the required area because of its importance to wildlife habitat (Polk Inlet EIS). The current OGR meets other Forest Plan requirements because it does not contain second-growth timber stands or roads, it is more circular than linear, and it includes a portion of the largest contiguous patch of old growth in the VCU. For ease of mapping, the northeast boundary was moved to Sunny Creek. The POG on the northeast side of Sunny Creek would be protected through the Forest Plan standards and guidelines for riparian buffers. The north and west boundaries of this OGR would be extended beyond the VCU boundary (Figure 3-9) to provide better wildlife connectivity between Sunny Cove and the McKenzie Inlet area. Field reviews identified this area has having high MMI soils, which made harvest Units 675-038 and 675-039 unsuitable for timber harvest and removed approximately 1.4 MMBF from the timber base. Wildlife habitat in the McKenzie Inlet area has been modified by timber harvest and roads. Extending the north and west boundaries would increase the size of the OGR to 3,183 acres and the POG to 1,276 acres. This size increase has limited effect on this or future timber harvests since the areas are not suitable for harvest due to steep slopes and high MMI soils.

Monie Lake (VCU 616). This OGR currently meets the acreage requirements but is lacking in other characteristics (Forest Plan, 1997, Appendix K) of the Old-growth Reserves. The OGR is linear and has few south facing slopes of POG, it has little habitat for goshawk or marbled murrelet nesting, and it does not contain the largest contiguous patch of POG in the watershed. All of the POG in this reserve is within the beach buffer. Adding the corridor of old-growth forest around Monie Lake would retain the connection between the beach reserve and the medium reserve in VCU 617 and 676. This corridor contains important goshawk and murrelet nesting habitat, and deer winter range on the south-facing, low-elevation slopes on the north side of Monie Lake. It also includes a portion of the largest, contiguous patch of POG in the VCU.

Several options were considered to adjust this OGR (Biodiversity and Old Growth Report, project file). The ID team modified Option D by adjusting the OGR boundary around the harvest units and retaining the beach fringe OGR (Fig 3-9).



-  Saltwater
-  Project Boundary
-  TLWP Old Growth Reserve
-  Alternative Old Growth Reserve

CHOLMONDELEY
DEIS

November 2000
Old Growth
Reserves

2 0.0 2 miles

Figure 3-9

The adjusted OGR would be 1,825 acres with 832 acres of POG. Approximately 321 acres (39 percent) of the POG would be in the high-volume strata. The corridor is 264 feet at the most constricted part and does not provide any interior habitat at that point. The south boundary avoids Units 616-011, 616-012, 616-013, and 616-021 and does not foreclose on any timber volume. The ID team believes this option best meets the old-growth reserve criteria within the multiple use concept. Though the OGR is more linear than circular, it provides quality POG at the preferred Forest Plan level (800 acres) and enhances connectivity between the beach fringe and medium OGR. The linearity of the OGR would be compensated by the POG that is neither in the OGR nor proposed for harvest.

The interagency biologists recommended Option A which would have dropped the north and south ends of the beach fringe OGR and extended the boundaries west, encompassing Units 616-011, 616-012, 616-013, 616-021, and parts of Units 616-018 and 616-019 (Figure 3-9). Approximately 273 acres and 6.2 MMBF would be removed from the available timber base. This option would include some high quality deer winter range and enhance connectivity between the medium OGR and beach buffer. It also has high nesting habitat potential for goshawk and marbled murrelet. Exchanging this timber area for the beach fringe area of the OGR would not compensate the loss of available timber because programmed timber harvest is not allowed in the beach fringe (Forest Plan, 1997, page 4-5).

Options B and C were similar to Option A because they traded beach fringe OGR for area around Monie Lake (Figure 3-9). However, the “new” OGR’s would have been more linear than in Option A and would have extended to the medium OGR. Options B and C contained valuable deer winter range and nesting habitat for goshawks and marbled murrelets. These options decrease the area of the OGR and slightly decrease the area of POG. The size of the OGR under Option B would be slightly greater than the minimum Forest Plan requirements but Option C would drop below. The POG under both options, though less than that of Option A, would be higher than the minimum required in the Forest Plan. Options B and C would have foreclosed on 5.1 and 5.8 MMBF of timber on 215 and 210 acres, respectively.

Option D was similar to Option B but retained less of the beach fringe OGR. The total area of this proposed OGR was less than Forest Plan requirements but the area of POG would meet the requirements. This option foreclosed on 1.6 MMBF of timber on 60 acres.

Saltery Cove (VCU 614). This OGR is along the east side of Swan Lake. It meets the size requirements for OGR and POG but is 118 acres less than the preferred 800 acres of POG (Forest Plan, Appendix K). Approximately 2,387 acres of POG are available in the VCU. There is concern that the beach buffer north of this reserve would be logged when the encumbered land is conveyed. If the beach buffer is logged, it would disrupt the connectivity between this reserve and the beach fringe. The proposed OGR boundary changes facilitate mapping and do not appreciably enhance old-growth habitat features. The proposed boundary changes would extend the southern boundary to connect the OGR with the McKenzie watershed. The northern boundary would extend to the private land boundary (Figure 3-9). The modified OGR would be 1,880 acres and have 636 acres of POG. High-volume POG would be about 167 acres or 26 percent of the POG.

No modifications were recommended for the small old-growth reserves in VCU’s 615 or 674 because they meet Forest Plan standards. Recommendations were also not

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made for the medium old-growth reserve in VCU 617 and 676 though it has 4,252 (40 percent) acres of POG of which 1,417 acres (33 percent) are high-volume strata. The Forest Plan requires medium reserves contain a minimum of 5,000 acres POG and at least 2,500 acres of high-volume strata POG (Forest Plan, Appendix K)

Table 3-16: Proposed Changes of Small Old-growth Reserves

Small Reserve Area (acre)	Value Comparison Unit				
	614	615	616	674*	675
Size Required	1,156	1,554	1,002	2,586	1,113
Actual Size	1,826	1,940	1,264	4,061	2,545
Proposed Size	1,880	same	1,825	same	3,183
Required POG	578	777	501	1,428	557
Actual POG	682	970	642	1,702	1,083
Proposed Size	636	same	832	same	1,276

* The OGR for VCU 674 is located outside of the Cholmondeley Project Area boundary.

Road Density

The project area includes most of Wildlife Analysis Area (WAA) 1212 (97 percent), 43 percent of WAA 1213 and 1 percent of WAA 1214. Roads do not exist in the project area. However, WAA 1214 has 154 miles of road and a road density of 1.3 miles per square mile (mi/mi^2) (Table 3-17). WAA 1212 and 1213 have road densities of 0.03 and 0.01 mi/mi^2 , respectively.

Alternatives 3, 4, and 5 would construct 5, 19, and 26 miles of road (including temporary roads), respectively. None of the roads built under any of the alternatives would connect to the main road system of Prince of Wales Island. The road systems would not interconnect in the project area either.

The 0.9 miles of road constructed in WAA 1214 under Alternatives 4 and 5 would not increase the road density (Table 3-17). Road density in WAA 1212 would increase to 0.4 mi/mi^2 and to 0.1 mi/mi^2 in WAA 1213.

On the project area, road density would be 0.06 mi/mi^2 for Alternative 3 and 0.2 and 0.3 mi/mi^2 for Alternatives 4 and 5, respectively. Under all alternatives the roads in Saltery Cove and Sunny Cove would be closed within three to five years of sale completion so open road density would be zero. Roads in the Clover Bay area would be open to ATV, snowmobile, motorbike, bicycle, and pedestrian use. Open-road density in WAA 1212 would be 0.1 mi/mi^2 following timber harvest.

Table 3-17: Road Miles and Density in Each WAA on the Cholmondeley Project Area, by Alternative

Miles of Road (Road Density)	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
WAA 1212	2.0	2.0	2.0	13.0	23.0
(mi/mi^2)	(0.03)	(0.03)	(0.03)	(0.2)	(0.4)
WAA 1213	0.3	0.3	5.3	5.3	5.3
(mi/mi^2)	(0.01)	(0.01)	(0.1)	(0.1)	(0.1)
WAA 1214	154.0	154.0	154.0	154.9	154.9
(mi/mi^2)	(1.3)	(1.3)	(1.3)	(1.3)	(1.3)

Wildlife Species: Management Indicator Species

This section evaluates the potential effects of harvesting timber and building roads and log transfer facilities on key wildlife species within the project area. Special emphasis is placed on Sitka black-tailed deer, Alexander Archipelago wolf, marten, hairy woodpecker, brown creeper, Vancouver Canada goose, and Prince of Wales flying squirrel. Brown bear, mountain goat and red squirrel are not included in the analysis because they do not occur on Prince of Wales Island.

Sitka Black-tailed Deer (*Odocoileus hemionus sitkensis*)

During severe winters Sitka black-tailed deer are dependent on low-elevation, high-volume old-growth stands. These stands provide thermal cover and maintain forage availability through winter (Forest Plan FEIS, page 3-367). Old-growth patches of 1,000 acres or larger are believed to provide optimum deer habitat (USDA Forest Service, 1991a). Fragmentation of deer habitats may increase deer vulnerability to predators, especially in winters of heavy snowfall (Forest Plan FEIS, page 3-403). WAA 1212 has experienced less than a 1 percent decline in deer habitat capability since 1954. WAA 1213 has experienced a 1 percent decline and WAA 1214 has experienced an 18 percent decline in deer habitat capability since 1954.

The project area contains about 12,206 acres (23 percent of the project area) of deer winter range. High-quality deer habitat is generally located in two watersheds: Monie Lake, and Sunny Cove. The Sunny Cove watershed includes the north shore of West Arm of Cholmondeley Sound. The highest quality deer winter range exists in the highest volume class (6) on south, west, or east facing slopes below 800 feet elevation. There are 1,159 acres of high quality old growth in the project area. The next best deer winter range is in volume class 5 on south and west facing slopes below 800 feet. The project area has 1,656 acres of this quality deer winter range. These higher value winter ranges make up 23 percent of the deer winter range in the project area.

Effects are projected to 2095, the end of the 100 year rotation. Timber harvest in WAA 1214 is under a 200-year rotation. However, no timber harvest is planned in the Cholmondeley portion of this WAA.

A 9 percent decline in deer habitat would be expected over the next 100 years in WAA 1212 (Table 3-18). Since most of WAA 1212 is in the project area, we can attribute this predicted decline to the project. A 5.5 percent decline would be expected in WAA 1213 and a 19 percent decline in WAA 1214.

Table 3-18: Predicted Deer Habitat Capability and Population Density Through 100 Years in Each Wildlife Analysis Area of the Cholmondeley Project

WAA	Deer Habitat Capability			Decline (%)			Deer Density (deer/mi ²)	
	1954	1995	2095	1954-1995	1995-2095	1954-2095	1995	2095
1212	952	947	862	<1%	9%	10%	19	17
1213	838	829	792	1%	5.5%	6.5%	21	20
1214	1867	1530	1240	18%	19%	33-37%	13	11

WAA 1214 is currently below the recommended deer population density of 17 deer/mi². WAA's 1212 and 1213 are both currently above the recommended density with 19 and 21 deer/mi², respectively (Table 3-18). In WAA 1214 deer density would drop to 11 deer/mi² in the next 100 years. In WAA 1212, deer density would be at the minimum and WAA 1213 would remain above the Forest Plan standard. Since this

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project does not harvest timber in WAA 1214, the decline in deer habitat would be attributed to previous and on-going habitat alteration in other areas of the WAA.

As shown in Table 3-19, 32 percent of the best winter range would be harvested under Alternatives 2, 3, and 5 and 23 percent would be harvested under Alternative 4. Twenty-one percent of the good quality deer winter range would be harvested in Alternatives 2, 3, and 5 and 13 percent would be harvested in Alternative 4. The combined area of the two highest quality deer winter ranges would be 5 percent of the project area. After timber harvest, good quality deer winter range would exist on 4.2 percent of the project area under Alternatives 2, 3, and 5, and 4.7 percent of the project area under Alternative 4.

Table 3-19: High Quality Deer Winter Range in the Cholmondeley Project Area (Remaining Acres and % of Strata Harvested)

Deer Winter Range (<800 feet)	Alt. 1	Alts. 2, 3, 5		Alt. 4	
	Existing Acres	Remaining Acres	Strata Harvested (%)	Remaining Acres	Strata Harvested (%)
Volume class 6; W, S, and E aspect	1159	789	32	897	23
Volume class 5; S and W aspect	1656	1438	13	1558	6
Total quality habitat acres	2815 (5.0 %)	2227 (4.2 %)	(21 %)	2455 (4.7 %)	(13 %)

Alexander Archipelago Wolf (*Canis lupus*)

The Alexander Archipelago wolf is a subspecies of the gray wolf and an important furbearer. Two viability concerns exist for wolves: 1) a short-term concern involving the amount of trapping and hunting of wolves, and 2) a long-term concern involving reductions in deer habitat capability. Wolf populations are threatened when road densities in a WAA exceed 0.7 mi/mi² or when deer populations drop below 17 deer/mi² (USDA 1998b). Open road densities must not exceed 0.7 mi/mi² to maintain wolf populations (Forest Plan ROD, page 55).

Wolf habitat capability is expected to decline relative to the decline in deer habitat capability, since deer are the primary prey of wolves. Implementing any of the action alternatives would result in a reduction in deer habitat capability (Table 3-18). In WAA's 1212 and 1213, deer populations would be high enough to sustain both wolf and human deer harvest demands.

Open road density during timber harvest would be less than the Forest Plan standards under all alternatives (Table 3-17). Open road density would be zero when post-silvicultural exams are complete except in WAA 1212. Trapping and hunting pressure on wolves would increase in the Clover Bay and Monie Lake areas under Alternatives 4 and 5. Road closures would mitigate the potential wolf harvest; however, even closed and unmaintained roads provide trails and easier access than is currently available.

Marten (*Martes americana*)

Marten prefer old-growth forest stands with a canopy closure greater than 40 percent. The diversity of understory plants and structures typical of old-growth forests supports a variety of marten prey. Downfall, stumps or slash provide access routes allowing marten to hunt below deep snow. Overstory cover provides marten with protection

from bird predators. The fallen logs, decadent trees and large snags in old-growth forests provide resting and denning sites for marten (Suring et al., 1992; Strickland and Douglas, 1987).

There are currently 6,309 acres of high value marten habitat representing about 12 percent of the Cholmondeley Project Area. The largest patches of marten habitat exist in the Saltery Cove, Monie Lake and Sunny Cove watersheds as well as along the West Arm of Cholmondeley Sound. Optimum habitat use occurs when patches of preferred habitat are greater than 180 acres (USDA, 1991; 3-209). Use declines as patch size decreases, and patches less than 10 acres are not used (USDA, 1991a). There are currently 23 patches of this type of habitat greater than 101 acres in the Cholmondeley Project Area. Marten habitat capability has not changed since 1954 because no significant logging, road building, or other development has occurred within the project area. The project area currently contains enough high value habitat to support an estimated population of 55 marten. The Cholmondeley Project is within a high-risk biogeographic province because of the logging and road building activity that has occurred in other areas of the province. The standards and guidelines for areas where less than 33 percent of the original forest has been harvested are applied under all alternatives (Forest Plan, page 4-119).

Habitat capability would decline to support 50 marten under Alternatives 2, 3, and 5 and 52 marten in Alternative 4. Between 6 and 8 percent of the high-value marten habitat would be harvested (Table 3-20).

Table 3-20: Marten Habitat Capability

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Habitat Capability	55	50	50	52	50
Harvested Habitat Acres	0	502	502	373	502
(%)	(0)	(8)	(8)	(6)	(8)
Marten population decline (%)	0	9	9	5	9

Marten densities decrease when road densities exceed 0.2 mi/mi², and could be reduced by as much as 90 percent when road densities approach 0.6 mi/mi² (Suring et al. 1992). Road densities in WAA 1212 are 0.2 mi/mi² under Alternative 4 and 0.4 mi/mi² under Alternative 5 (Table 3-17). Leaving the road to Monie Lake open would create an open road density of 0.1 mi/mi². Therefore, we would expect marten populations to decline during timber harvest. This decline may continue at a slower pace after timber harvest or stabilize at a lower population density. Road density in WAA 1214 is 1.3 mi/mi² but activities proposed in this project do not increase road density. The 0.9 mile of road built in Alternatives 4 and 5 does not connect to the rest of the road system in WAA 1214. The roads in WAA 1213 would be 0.1 mi/mi² during harvest and closed following harvest. This road density is less than 0.2 mi/mi² so we would not expect a decline in marten populations. Over the project area, road density would have limited effects on marten populations. However under Alternatives 4 and 5, localized populations would experience higher levels of trapping where roads cross riparian areas. We would expect this to occur in the Monie Lake area where roads would remain open.

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Hairy Woodpecker (*Picoides villosus*)

The hairy woodpecker is a primary cavity nester and prefers stands of older western hemlock and Sitka spruce with a large snag and decadent tree component. Primary cavity nesters excavate tree cavities which other birds and mammals use after they abandon them. Patches larger than 500 acres of this type of habitat receive optimum use (Forest Plan FEIS, page 3-357). There are currently eight such patches in the project area.

Habitats used during the winter are below 1,500 feet in elevation and are characterized by high, dense canopy cover provided by large, widely spaced trees. High quality habitat for the hairy woodpecker is concentrated mainly in the Saltery, Monie Lake and Sunny watersheds, and the West Arm of Cholmondeley Sound.

The hairy woodpecker would benefit from this project as the number of patches and average patch size in the 101-500 and 501-1000 acre size classes increase from the existing condition (Tables 3-13 and 3-14). Additional habitat would be retained by implementing Forest Plan standards for high-value marten habitat (Forest Plan, page 4-119) and for reserve trees (Forest Plan, page 4-117). Leaving the largest contiguous patch of old-growth timber, or a portion of it, in each VCU as an old-growth reserve, and leaving structure within the units would help maintain the necessary habitat for hairy woodpeckers. Based on this information, snag habitat for hairy woodpeckers and other snag-dependent species would be maintained throughout the project area.

Brown Creeper (*Certhia americana*)

The brown creeper is associated with large old-growth trees (high-volume strata) and is most closely associated with high-volume old-growth forest (Forest Plan FEIS, page 3-357). Large diameter trees are preferred because a bird can feed longer on a large tree and capture more prey per visit. Old-growth conifer stands below 1,500 feet in elevation and greater than 20,000 board feet per acre are the preferred habitat. Optimum use occurs in patches of high-volume forests larger than 15 acres (Forest Plan FEIS, page 3-357). In the Cholmondeley Project Area, most of the higher volume old growth occurs in the Sunny Creek and Saltery Cove watersheds and the West Arm of Cholmondeley Sound.

The brown creeper would likely experience no detrimental changes in habitat. Patches of POG in the 0- to 25-acre size class increase though the average patch size decreases (Tables 3-13 and 3-14). Patches of POG in the other size classes remain relatively stable and would compensate for decreased average patch size in the smallest size class. In Alternatives 2, 3, and 5, seven percent of the POG is harvested (Table 3-15). Alternative 4 would harvest 5 percent of the POG. Implementation of snag and reserve tree standards and guidelines would mitigate harvest effects on brown creeper (Forest Plan, pages 4-117, 4-119).

Vancouver Canada Goose (*Branta canadensis fulva*)

The Vancouver Canada goose is a relatively non-migratory species. They are unique among the subspecies of Canada geese because they use forested habitat for nesting, brood-rearing and molting (Lebeda and Ratti, 1983). High quality nesting and brood-rearing habitat is associated with low-volume old growth on poorly drained soils, adjacent to small wetlands, lakes and riparian areas. Beach fringe and estuaries are high quality habitats for the Vancouver Canada geese. Hansen (1962) indicated that nesting and brood-rearing is probably the most limiting habitat factor. The Vancouver Canada goose reportedly avoid habitat located within 660 feet of an open road (Control Lake FEIS; page 4-53).

Nesting and brood rearing habitats are generally the lower volume timber stands and would likely not be affected by timber harvest; however they may be impacted by road construction. Forest Plan standards and guidelines for waterfowl (Forest Plan, page 4-116), beach and estuary fringe (Forest Plan, page 4-5), and riparian areas (Forest Plan, page 4-55) would mitigate potential impacts.

Prince of Wales Flying Squirrel (*Glaucomys sabrinus griseifrons*)

The Prince of Wales flying squirrel is associated with old-growth forest and may be genetically distinguished from other flying squirrel populations. Conservation needs of flying squirrels specifically include a 1,600-acre small habitat reserve in each 10,000 acre watershed to sustain habitat that support well-distributed populations capable of interaction across the landscape (Forest Plan FEIS, page 3-414). Breaks in corridors should be less than 65 feet wide to facilitate flying squirrel dispersal (Forest Plan Appendix N, page N-17). There are approximately 6,487 acres of high-volume strata in the project area.

Flying squirrel habitat would be expected to decline relative to the harvest of old-growth forest. Local populations may be displaced because stands of sufficient size to support a population are not maintained. The multi-scale Conservation Biology Strategy of the Forest Plan was designed to meet the habitat needs of old-growth associated species, including the flying squirrel. Components of the original forest canopy would be retained within harvest units and mitigate potential adverse effects resulting from timber harvest (Forest Plan, page 4-119).

Cumulative Effects to Wildlife Habitats and Species

The areas surrounding the project area have in some cases been intensively harvested. Extensive clearcut timber harvest has occurred on the non-federal lands of Polk Inlet, Sulzer Portage, the south shore of the West Arm of Cholmondeley Sound, and the north shore of Skowl Arm. The Forest Service has harvested timber in Polk Inlet, Skowl Arm and McKenzie Inlet and Southeast of Cholmondeley Sound. The Polk Inlet ID team noted the large unfragmented interior blocks of old-growth habitat in Sunny Cove, Cannery Creek, Big Creek and Sulzer Portage were the only interior valleys to contain high quality deer winter range and Management Indicator Species habitat. They noted these areas were dominated by high-volume old growth at relatively low elevation and were critical links between Old Toms Research Natural Area and the South POW ecological province. Since the writing of the Polk Inlet FEIS the areas of Sulzer Portage and Big Creek have been conveyed to a Native Corporation and the timber harvested. The Forest Service has timber harvest units in the Cannery Creek watershed (Chasina FEIS). Sunny Creek is the only drainage that has not been harvested. The wildlife effects of harvesting timber in the Sunny Creek area may be compounded by the effects of harvest and road construction in adjacent areas. With the proposed harvest in Sunny Cove, the old-growth retention area mapped in the Polk Inlet EIS is reduced by about half, which diminishes its function as habitat or migration corridor. Timber harvest in Sunny Cove has the potential to effect wildlife species such as deer, black bear, geese, cranes and other waterfowl.

The land around Saltery Cove has recently been conveyed to Native corporations and the State of Alaska. If these areas are logged as other conveyed lands have been, a break in the beach fringe corridor would occur.

3 Environment and Effects

Threatened, Endangered, and Sensitive Species

This section evaluates the potential effects of harvesting timber and building roads and LTF's on wildlife and plant species within the project area listed as threatened and endangered under the Endangered Species Act, and Forest Service sensitive species. Threatened, endangered and sensitive species are addressed in the Biological Evaluation (BE) and Biological Assessment (BA) for the Forest Plan and in the BA for this project. These documents are incorporated into this analysis by reference.

Threatened and Endangered Species

Threatened and endangered species are plant and animal species formally listed by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), under the authority of the Endangered Species Act of 1973, as amended. The State of Alaska has an Endangered Species law that authorizes the commissioner of the Alaska Department of Fish and Game (ADF&G) to list Alaska endangered species. The Regional Forester designates "Sensitive species" occurring in National Forests.

One endangered fish, the Snake River sockeye salmon (*Oncorhynchus nerka*), and two threatened fish species, the Snake River fall Chinook salmon (*Oncorhynchus tshawytscha*) and the Snake River spring/summer Chinook salmon may be present in the saltwater around the project area. They may occupy this area during the marine rearing period of their life cycle but their presence has not been documented.

The endangered humpback whale (*Megaptera novaeangliae*) and the threatened Steller sea lion (*Eumetopas jubatus*) occur in the saltwater around the project area. The endangered American peregrine falcon (*Falco peregrinus anatum*) may occur in the project area (Appendix E). Biological Assessments for the American peregrine falcon, and the humpback whale and Steller sea lion were submitted to the USFWS and NMFS, respectively. No other threatened, endangered birds or mammals are known to occur in the project area. None of the alternatives are anticipated to adversely affect the humpback whale, Steller sea lion, or American peregrine falcon. The planned activities do not occur in habitats used by these species or occur on a limited scale, such as LTF's.

Sensitive Species

Animal species listed as sensitive that have the greatest potential to occur within the project area are Peale's peregrine falcon (*Falco peregrinus*), Queen Charlotte (northern) goshawk (*Accipiter gentilis*), and the trumpeter swan (*Cygnus buccinator*) (Appendix E). Trumpeter swans have been reported in the Saltery Cove area. Suitable nesting, brood rearing, and wintering habitat exists in the project area, especially in the Sunny Cove estuary. Noise from road construction, timber harvest, and log hauling could frighten swans from their preferred resting and feeding areas (Chasina FEIS; page 3-203).

Nine sensitive plant species may occur in the project area. The Queen Charlotte butterweed (*Senecio moresbiensis*) is the only species whose presence has been documented (Appendix E). Project activities may adversely affect some individuals but are not likely to tend a species toward listing as threatened or endangered.

Pacific Yew, (*Taxus brevifolia*)

The Pacific Yew tree is protected under the Pacific Yew Tree Act of 1992 (January 3, 1992, 16 U.S.C. 4804).

Pacific yews are scattered through the understory of several units in the Monie Lake watershed and Sunny Cove area. Direct effects of timber harvest may cause some trees to be crushed, broken, or damaged during timber felling and cable yarding. This damage would be limited by the layout of corridors for the cable yarding systems and directional falling. Helicopter yarding would leave more of the understory standing and less damage would occur during yarding (Appendix B). Regeneration capabilities would be maintained because ground cover would remain intact (USDA 1990). Pacific yew can be regenerated under various canopy densities (Mitchell, A.K., 1998).

Subsistence

Section 810 of ANILCA requires a federal agency having jurisdiction over public lands in Alaska to analyze the potential effects of proposed land use activities on subsistence uses and needs. An ANILCA 810 analysis must include several components. First, the proposed actions must be analyzed to determine if they significantly restrict subsistence uses. This analysis must be concluded with a draft determination either of "no significant effect" or a determination that describes possible effects. For any conclusion other than "no significant effect," formal ANILCA hearings must be conducted. Following these hearings, a final determination based on an analysis of the potential effects of the final proposed action must be published.

This analysis focuses on the potential effects, including cumulative effects, of timber harvest and road construction on the abundance and distribution of subsistence resources and opportunities to harvest them. This analysis tiers to the comprehensive analysis of the Forest Plan (Forest Plan FEIS, pages 3-210 to 3-229).

Two small communities with full-time residents are included in the Cholmondeley Project Area: Sallery Cove and Sunny Cove. Effects of this project on subsistence activities associated with Sunny Cove are discussed above in Issue 3. Formal data on subsistence use within these communities is not available. However, the subsistence life-style of hunting, fishing, and gathering is practiced in these communities. Salmon, trout, deer, black bear, and marten are the principal resources used for subsistence.

Kasaan is the only subsistence community outside the project area that may be affected by the proposed activities. Minor subsistence use by members of this community has been documented in Wildlife Analysis Area (WAA) 1213. No community accounts for more than 5 percent of the subsistence use in either WAA 1212 or 1213. WAA 1214 is only 1 percent of the project area and is not included in this analysis. Ketchikan is the only other community outside the project area that uses the area for hunting. Ketchikan is a non-rural community whose residents do not qualify as subsistence users. WAA's 1212 and 1213 do not account for subsistence use for any Southeast Alaska community (Forest Plan FEIS, Appendix H).

No roads currently exist on the project area. Access to the area is by boat or float plane.

Access

Alternatives 1 and 2 would not change access because no roads would be built. Alternatives 3, 4, and 5 would change access in Sunny Cove and Alternatives 4 and 5 would also change access in Sallery Cove and Clover Bay. All roads built in

3 Environment and Effects

Alternatives 3, 4, and 5 would be closed to passenger vehicles following timber harvest. In addition, the roads constructed in Sunny Cove and SALTERY Cove would be closed to all motorized uses. Therefore, the roads in Clover Bay would facilitate both ATV and hiking access, while those constructed in Sunny Cove and SALTERY Cove would facilitate only hiking access.

Abundance and Distribution

Deer

Timber harvest would reduce deer habitat capability (Table 3-18). For the majority of the project area, we estimate that deer population density would be between 17 deer/mi² (WAA 1212) and 20 deer/mi² (WAA 1213) in 2095 (Table 3-19). The deer population density in WAA 1214 is predicted to drop to 11 deer/mi² as a result of activities that have occurred outside the project area in this WAA.

Marten

Marten habitat would be reduced between 6 percent in Alternative 4 and 8 percent in Alternatives 2, 3, 5. Marten population declines have been noted when road densities reach 0.2 mi/mi²; when road densities reach 0.6 mi/mi², population declines of 90 percent have been noted. Population declines associated with road construction would not occur in WAA 1212 under Alternatives 1, 2, and 3. Populations would decline during timber harvest under Alternatives 4 and 5. Population declines around SALTERY Cove would be the same under both alternatives since the amount of road construction is the same. Population declines in the area north of Clover Bay would be less in Alternative 4 than Alternative 5 because no roads are built north of Monie Lake in Alternative 4. In neither of these alternatives would populations decline 90 percent during harvest (see Marten and Road Density subsections, above). When roads are closed to motorized use following timber harvest, marten populations would recover though not to their original levels. The roadbeds would provide easier access for marten trapping. The road between Clover Bay and Monie Lake would remain open to some types of motorized use so population recovery would not be expected in this area.

The road system in WAA 1213 would not cause marten population declines either during or following timber harvest because road density does not exceed 0.1 mi/mi². In WAA 1214, open road density of 1.3 mi/mi² is currently above the road density threshold of 0.6 mi/mi². However, the additional 0.9 mile of road constructed in Alternatives 4 and 5 does not increase the open road density or connect with the road system in WAA 1214. Thus this road segment would not add incrementally to the effects on marten populations in this WAA.

Competition

Increased competition between subsistence hunters, and between subsistence hunters and sport hunters is not expected. Available data suggests this area is not heavily used by subsistence or sport hunters (Forest Plan FEIS, pages 3-588 to 3-591). Constructing road systems may increase access to the project area and thereby increase hunter use. The roads in the project area are isolated from the main Prince of Wales road system and from each other. In addition these three separate road systems would be closed to passenger vehicles. Therefore, we do not anticipate large increases in use.

Draft EIS Finding

This finding is based on the evaluations presented above on access, abundance and distribution, and competition for harvested resources in the study area. In WAA 1214

the abundance and distribution of marten are below recommended levels and deer will be below recommended levels in 2095; however, only one percent of this WAA is within the project area. Abundance and distribution of both marten and deer will remain within recommended levels in WAA's 1212 and 1213.

The results of this analysis indicate that the direct effects of the Cholmondeley Project and the potential foreseeable and cumulative effects from implementing the Forest Plan through the end of the rotation do not present a significant possibility of a significant restriction to any subsistence uses (Subsistence Report, project file).

Watersheds are areas that collect and discharge runoff through a given point on a stream. The project area contains 53 delineated watersheds. Within the Cholmondeley Project Area, timber harvest is proposed in 24 watersheds and road building is proposed in 20 of the watersheds.

Affected Environment

The high concern watersheds identified in the Watershed Analysis (Watershed Analysis Report and Floodplains, Soils and Wetlands Resources Report, project file) are Sunny Creek (F27A), Monie Creek (F33A), Saltery Creek (F37A), and Drinking Water Creek (F28A). These watersheds are more sensitive to management activities because the commercial forest land is on steep slopes bisected by streams with high value fish habitat lower in the watershed. The recommendations made in the Watershed Analysis Report and Floodplains, Soils and Wetlands Resources Report (project file) were incorporated into the Cholmondeley alternatives. These recommendations apply Forest Plan standards and guidelines to conserve stream channel stability, floodplain integrity, and high quality fish habitat.

Direct and Indirect Effects

Proposed harvest in the high value watersheds is displayed in Table 3-21. Proposed units in these high concern areas are 614-034 and 614-005 in the Saltery Creek watershed, 616-021 and 616-275 in the Monie Creek watershed, and 675-033 and 675-037 in the Sunny Creek watershed. Harvest of other watersheds in the project area is described in the Fisheries, Watershed, and Riparian Report (project file).

Table 3-21: Percent of High Concern Watershed and Commercial Forest Land Proposed for Harvest in the Cholmondeley Project Area

Watershed Name and Number	Area (Acres)	CFL (Acres)	Area Harvested (%)	CFL Harvested (%)
Saltery Creek (F37A)	4,237	970	4	16
Drinking Water (F28A)	658	86	8	58
Monie Creek (F33A)	2,079	719	18	53
Sunny Creek (F27A)*	4,832	832	5	27

* No timber harvest is proposed in Sunny Creek watershed under Alternative 4. The amount of harvest is the same for all other alternatives in these watersheds.

We expect no direct or indirect effects on watershed resources because of the design criteria incorporated into the alternatives and the small percent of each watershed harvested.

Watersheds

3 Environment and Effects

Soil Productivity and Stability

Soil productivity on the project area is primarily a function of geology, soil drainage and soil depth. The Forest Plan has identified three soil productivity issues that are pertinent to the soils on the Cholmondeley Project Area:

1. Soil productivity loss due to construction of roads and development of rock pits.
2. Soil productivity loss due to soil displacement.
3. Soil productivity loss due to slight changes in soil drainage as a result of harvesting timber from relatively low-volume stands growing on poorly drained organic soils.

Soil productivity on poorly drained organic soils is discussed in the wetlands section. There are no existing roads or rock pits on the project area.

The intent of the Regional Soil Quality Standards is to maintain soil productivity within acceptable limits. The standards allow up to 15 percent of an activity area to be in a detrimental soil condition. The activity area used in this analysis is the harvest unit. Soil disturbance within harvest units can reduce soil productivity, especially areas of well-drained, shallow organic soils underlain by bedrock (McGilvery soils). Soil disturbances are created when felling trees or yarding logs displaces the surface organic mat. Soil disturbances larger than 100 square feet are considered detrimental and are referred to as soil displacements (FSM 2554 #2500-92-1).

Log suspension during yarding minimizes soil disturbance and maintains the root mat. Partial cuts are prescribed on some units of all the action alternatives and further maintain the root mat. Landwehr (1999 unpublished) found that approximately 3.0 percent of the soil surface was displaced in harvest units yarded with partial suspension cable logging systems on slopes over 75 percent. Soil was displaced on 1.8 percent of the harvest unit when logs were yarded with full suspension systems. Based on this information, the soil scientist assumed 5 percent displacement (3 percent plus one confidence interval) for areas of partial suspension yarding and 2 percent displacement for areas with full suspension yarding. Partial harvest prescriptions are planned for 205 acres in Alternatives 2 and 5, and 471 and 124 acres in Alternatives 3 and 4, respectively.

Post-sale monitoring indicates the least amount of soil displacement would be in partial-cut units yarded by helicopters, due to full log suspension and the amount of root mat left intact. Based on post-sale monitoring, detrimental impacts to the soil resource would remain within Regional Soil Quality Standards (Table 3-22). The estimates displayed in Table 3-22 are based on timber harvested from very steep slopes. Soil displacement on gentler slopes would be less.

Roads

Most of the potentially adverse impacts to soil productivity would be from road construction. Road construction and rock pit development cover areas of soil with rock and overburden, effectively reducing site productivity.

There are no existing roads on the Cholmondeley Project Area. Alternatives 1 and 2 do not propose any new roads. Alternatives 3, 4, and 5 propose construction of 5, 19, and 26 miles of road, respectively. The analysis assumes a 40-foot wide disturbed soil area, or 4.8 acres of disturbance per mile of road (Table 3-22). The analysis also assumes a two-acre rock pit for every two miles of proposed road.

Alternative 5 creates the highest potential for impacts to soil productivity. Under this alternative, approximately 150 acres or 0.3 percent of the project area would be affected. The largest effect would be on the Monie Creek Watershed under Alternative 5. Almost 3 percent of the watershed could be impacted, which is well within the Regional Soil Quality Standards.

Table 3-22: Estimated Acres of Roads and Soil Displacements by Alternative and Major Watershed

Alternative and Disturbance Type	Monie Cr. Watershed	Saltery Cr. Watershed	Sunny Cr. Watershed	Other Watersheds	Total Acres
<i>Alternative 2</i>					
Soil Displacement	8	3	4	15	30
Roads & Rock Pits	0	0	0	0	0
Total Harvested	389	154	222	746	1,511
Detrimental Soil Cond.	8	3	4	15	30
Percent of Watershed	0.3	0.07	0.08	0.04	0.06
<i>Alternative 3</i>					
Soil Displacement	8	3	7	16	34
Roads & Rock Pits	0	0	9	20	29
Total Harvested	389	154	222	724	1,489
Detrimental Soil Cond.	8	3	16	36	63
Percent of Watershed	0.3	0.07	0.33	0.09	0.12
<i>Alternative 4</i>					
Soil Displacement	11	7	7	15	40
Roads & Rock Pits	41	15	9	38	103
Total Harvested	262	154	222	303	941
Detrimental Soil Cond.	52	22	16	53	143
Percent of Watershed	2.05	0.52	0.33	0.13	0.27
<i>Alternative 5</i>					
Soil Displacement	19	7	7	27	60
Roads & Rock Pits	55	15	9	71	150
Total Harvested	389	154	222	746	1,511
Detrimental Soil Cond.	74	22	16	98	210
Percent of Watershed	2.91	0.52	0.33	0.24	0.40

Landslides

Mass wasting (landslide) is the dominant erosion process in steep forested terrain with high soil water levels (Swanston 1969). Topographic, geologic and soil conditions usually determine where a landslide occurs but rainfall is probably the principle triggering force determining when landslides occur (Patric and Swanston 1969). Landslide inventories in Southeast Alaska have found that landslides in harvested areas are generally smaller though more frequent than in unharvested areas (Swanston and Marion 1991, Landwehr 1998 (unpublished), Bishop and Stevens 1964).

Naturally unstable areas on the Cholmondeley Project Area include:

- most of the slopes in the Saltery Creek basin upstream of Swan Lake,
- the north facing slopes draining into Trollers Cove,
- the steep slopes in the Monie Creek basin upstream of the lake,
- the upper slopes in the Sunny Creek basin, and
- most of the steeper slopes in the Clover Creek basin.

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The Forest Service uses a mass movement index (MMI) for preliminary identification of potentially unstable sites in a project area. The mass movement index summarizes the physical properties of a soil and rates the relative stability of the soil. The Cholmondeley Project Area has 5,740 acres of mapped MMI 4 soils. MMI 4 soils were not included in the timber base used to develop the Cholmondeley unit pool. Harvest units with indicators of instability were field reviewed by a soil scientist. Seven units were not considered for harvest and 11 units were modified following reconnaissance (Floodplains, Soils and Wetlands Resources Report, project file). In a few cases the ID team soil scientist identified slopes greater than 72 percent that are suitable for timber harvest due to lower than MMI 4 landslide potential.

Rationale for Timber Harvest on Some Slopes Over 72 Percent

Alternatives 2, 3, and 5 propose timber harvest on 79 acres with slopes over 72 percent. Alternative 4 proposes 55 acres of timber harvest on slopes over 72 percent. In most cases the slopes over 72 percent are short pitches adjacent to cliffs and rock outcrops (Table 3-23). Most of the steep-slope harvest is located in four harvest units: 614-001, 616-275, 675-033, and 675-037.

In Unit 614-001 the steep slopes are associated with a cliff and talus slopes near the upper unit boundary. In all alternatives, logs are yarded with full suspension by helicopters. The harvest prescription in Alternative 3 is a partial cut, which leaves more trees standing in the unit than in Alternatives 2, 4, and 5.

In Unit 616-275 the steep slopes are located below cliffs on some bouldery talus that is not prone to slide. In all action alternatives this area receives full suspension because the logs are yarded with helicopters.

The steep slopes in Unit 675-033 include short pitches around cliffs and one area of 85 percent slopes. Landslide potential is high in this area; however, the resources at risk downslope do not include perennial streams. Almost all of the slopes over 72 percent in Unit 675-033 would receive full suspension yarding with helicopters.

In Unit 675-037 the steep slopes are located in short pitches at the base of cliffs. The steep slope areas in Unit 675-037 are not prone to slide. This unit is proposed for helicopter yarding with full suspension. Due to existing blowdown and helicopter yarding, much advanced regeneration would be maintained in this unit.

Table 3-23: Acres of Slopes Over 72 Percent Gradient Identified as Suitable for Timber Harvest by the ID Team Soil Scientist *

Unit Number	Total Acres	Slopes >72 % (ac)	Watershed	Alts.	Prescription & Suspension**
614-001a	53	8	CU5A, Sportsman's Cv.	2, 3, 4, 5	Type A or D, full susp.
614-005	21	1	F37A, Saltery Cr.	2, 3, 4, 5	Type C, full suspension
614-034a	15	1	F37A, Saltery Cr.	2, 3, 4, 5	Type B, partial suspension
614-034b	65	3	F37A, Saltery Cr.	2, 3, 4, 5	Type B, partial suspension
615-025	39	2	F35A, Trollers East	2, 3, 5	Type D, full suspension
616-007	33	2	DD4A, South Monie	2, 3, 4, 5	Type D, partial suspension
616-008	36	1	DD4A, South Monie	2, 3, 4, 5	Type B, partial suspension
616-011	78	3	DD4A, South Monie	2, 3, 4, 5	Type D, partial suspension
616-013	69	2	F33A, Monie Cr.	2, 3, 4, 5	Type A, partial suspension
616-016	36	3	F33A, Monie Cr.	2, 3, 4, 5	Type B, partial suspension
616-019	17	1	F33A, Monie Cr.	2, 3, 5	Type B, full suspension
616-021	41	2	F33A, Monie Cr.	2, 3, 5	Type D, partial & full susp.
616-023	23	2	DD1A, Cliffo	2, 3, 5	Type A, partial suspension
616-024	55	3	000Z, Unnamed	2, 3, 5	Type D, partial suspension
616-275	71	8	F33A, Monie Cr.	2, 3, 5	Type B, partial & full susp.
674-548	14	1	F26A, 4th Westest	2, 3, 5	Type C, full suspension
674-549	28	2	000Z, Unnamed	2, 3, 5	Type C, full suspension
674-550	31	4	000Z, Unnamed	2, 3, 5	Type C, full suspension
674-551	34	3	000Z, Unnamed	2, 3, 5	Type C, full suspension
675-030	67	1	F27A, Sunny Cr.	2, 3, 4, 5	Type B, partial suspension
675-033	105	18	F27A, Sunny Cr.	2, 3, 4, 5	Type B, partial & full susp.
675-037	43	8	F27A, Sunny Cr.	2, 3, 4, 5	Type B, full suspension
676-462	14	1	F28A, Drinking Water	2, 3, 4, 5	Type C, full suspension
676-484	6	1	F30A, Scrubby	2, 3, 4, 5	Type C, full suspension
676-489	17	2	F30A, Scrubby	2, 3, 4, 5	Type C, full suspension
Totals	1,011	79			

*Only units with areas of slopes over 72 percent gradient are displayed.

** Suspension is for Alternatives 3 through 5; all units would receive full suspension in Alt. 2.

Source: Tongass NF GIS, ID team soil scientist's Notes, and field forester's estimates.

3 Environment and Effects

Direct and Indirect Effects: Landslide Probability

Factors affecting the landslide rate in harvest units include the amount of timber harvest on steep slopes and the amount of soil disturbance in harvest units. The probability of landslides in the next 20 years is one 0.6 acre landslide for each 622 acres of timber harvest and one 3.1 acre landslide for each 6,239 acres of old growth (Landwehr 1998, unpublished). The estimated area of landslides of each alternative (Table 3-24) is based on the above probabilities.

Table 3-24: Estimated Acres of Landslides by Alternative per 20-year Time Period

Alternative	Acres of Landslides			Total
	Old growth	Second growth	Road-related	
1	9.0	0.1	0.0	9.1
2	8.2	1.6	0.0	9.8
3	8.2	1.6	0.1	9.9
4	8.5	1.0	0.5	10.0
5	8.2	1.6	0.7	10.5

Landslides in old-growth forest would still occur and impact an estimated 9.1 acres under the No Action alternative (Alternative 1). Similar acres of landslides would result from implementation of most of the action alternatives. This is due to the large scale of the landslide frequency information compared to the relatively small scale of timber harvest proposed in the Cholmondeley Project. Intense local storm events often cause more landslides in one area than in adjacent areas. More landslides would occur in second growth; however, due to their smaller average size, the difference in total acres between alternatives is slight.

All units would be yarded with full suspension under Alternative 2. This alternative would have the best post-harvest slope stability of the harvest alternatives. Alternative 3 also uses helicopter yarding in most units and would result in less soil disturbance and better slope stability than Alternatives 4 and 5. Alternative 4 builds more road than Alternative 3 but harvests less timber, resulting in post-harvest slope stability similar to Alternative 3.

Landslides are considered a detrimental soil condition in the Region 10 Soil Quality Standards. Based on monitoring (Landwehr 1998, unpublished), landslides and other detrimental soil conditions will be within Region 10 Soil Quality Standards. Sunny Creek has the highest potential for management-induced landslides and impact to water quality due to the slightly deeper soils, amount of steep slope harvest, and proximity of slopes to streams. In the Clover Bay and Saltery Cove areas, less harvest is proposed on steep slopes, the slopes are shorter, and soils tend to be more shallow. Chances of management-induced landslides are therefore less, as are the chances a landslide would reach a stream.

Streams

Affected Environment

The project area contains 306 miles of mapped streams. Of these, 39 miles are Class I, 75 miles are Class II, 180 miles are Class III, and the remaining 12 miles are Class IV streams. More Class IV streams exist in the project area than are mapped. Only those Class IV streams that were adjacent to proposed roads or units and identified during reconnaissance were mapped. Class I streams provide anadromous or adfluvial fish habitat. Class II streams provide resident fish habitat but not anadromous fish habitat. Class III streams do not provide fish habitat but influence water quality and fish

habitat in Class I and II streams. Class IV streams are ephemeral, intermittent, or perennial streams that do not have an immediate influence on downstream water quality or fish habitat (Forest Plan, page 7-41).

Direct and Indirect Effects

A sediment risk assessment model (Geier 1998) was used to compare the risk of sediment entering a stream within the watershed. This model compares watersheds within a harvest scenario to identify the high-risk watersheds. It cannot be used to compare risk between alternatives. The criteria determining risk are: stream density, area of harvest, road density, channel types, and area of high hazard soils. The model classifies risk on a scale of 1 to 100. A higher value indicates higher potential of sediment to enter streams. The streams in Sportsman's Cove, South Monie, Sunny Creek, Sunny Drinking Water, and Monie watersheds have the highest risk of sedimentation (Fisheries, Watershed, and Riparian Report, project file). The streams in these watersheds would be closely monitored during project implementation to ensure appropriate BMP's are used.

Road construction in Alternatives 3, 4, and 5 requires crossing streams to access timber harvest units (Table 3-25). Effects of roads on fish habitat are usually manifested at stream crossings. Roads affect fish habitat by blocking fish migrations, introducing fine sediments to streams, and increasing drainage efficiency of the land. Road condition surveys relative to fish passage and water quality were conducted on most system roads on the Tongass National Forest between 1998 and 2000. The surveys revealed that 53 percent of Class I and 83 percent of Class II culverts on the Forest do not meet the standards for fish passage. Passage standards on Class I streams are that juvenile coho must be able to navigate upstream through a road crossing structure at any flow below that which occurs for a two-day duration during a two-year return interval flood. Of 4,096 culverts surveyed on the Craig Ranger District in 1998, fish passage was completely blocked on 15 percent of Class I stream crossings and 11 percent of Class II stream crossings (Road Condition Survey Data, project file). To prevent road damage and maintain water quality, 21 percent of the Class III stream crossings, 16 percent of Class IV crossings and 51 percent of cross-drains had a serious need for maintenance.

Table 3-25: Number of Stream Crossings by Alternative and Stream Class

Alternative	Class I	Class II	Class III	Class IV	Total
1	0	0	0	0	0
2	0	0	0	0	0
3	0	2	6	9	17
4	0	5	20	11	36
5	5	5	27	25	62

Alternative 5 has five crossings on Class I streams, all in the Monie Creek watershed. Alternative 5 requires 26 miles of new road construction while Alternative 4 would require building 19 miles and Alternative 3 requires 5 miles of roadbuilding. No roads would be built under Alternative 2, which is yarded exclusively with helicopters.

Roads built prior to 1997 were not built under the same environmental standards we use today. The Forest Service has recently increased emphasis on road construction and maintenance quality under the Forest Plan standards and guidelines and the Soil and Water Conservation Practices (FSH 2509.22). All fish stream crossings now undergo thorough review by Forest Service biologists, hydrologists, engineers and

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Alaska Department of Fish and Game biologists to ensure fish passage standards are met. Monitoring our performance under these standards will improve our effectiveness and decrease negative environmental effects.

Timber harvest would remove trees up to the streambank and disturb riparian vegetation along Class IV streams within harvest units. While these streams do not have an immediate influence on downstream water quality and fish habitat, they inevitably introduce sediment to the larger streams. Class IV streams can be important sources of spawning gravels and woody debris in fish streams. BMP's provide protections such as full or partial suspension yarding over the stream, directional felling, or split yarding. The specific BMP applied to the stream is based on the physical characteristics of the stream and the need to protect streambank integrity (Appendix D).

Alternatives 2 and 5 each have 7.3 miles of unbuffered Class IV streams within harvest units. Alternative 3 and 4 have 5.1 and 4.0 miles of unbuffered streams, respectively. Alternative 1 does not harvest timber so no streams would be affected. Since Alternative 2 and most of Alternative 3 are yarded with helicopters and have full suspension, we expect minimal disturbance to these stream reaches relative to Alternatives 4 and 5.

Riparian Areas

Riparian areas encompass the zone of interaction between the aquatic and terrestrial ecosystems, and include streams, lakes, and floodplains with distinctive resource values and characteristics. Riparian Management Areas (RMA's) are land areas of special concern for fish, other aquatic resources and wildlife. The components of RMA's are specified in the Forest Plan (page 4-53), which also provides direction for the management of riparian resources. Buffer widths are specified for particular channel types (Forest Plan, pages 4-58 to 4-73). Where high value wetlands or unstable soils are adjacent to these buffers, they are included in the RMA. Areas managed to provide a reasonable assurance of windfirmness to the buffer are not considered part of the RMA.

Affected Environment

The project area contains 8,337 acres of RMA's. The riparian area of Sunny Creek is the most productive in terms of timber and fisheries resources. Productive fens that support anadromous fish populations are at the south end of Swan Lake and west of Monie Lake. All riparian areas are in a relatively pristine state because there has been little harvest in the project area.

Direct and Indirect Effects

Timber harvest and road construction activities adversely impact riparian areas by vegetation removal, disturbing soils, and eliminating a source of large woody debris. These activities result in erosion, high levels of stream sediment, destabilized streambanks, and reduced channel integrity. Timber harvest adjacent to riparian areas also accelerates windthrow. Proposed harvest activities are adjacent to the riparian areas of four Class I streams, four Class II streams, and 16 Class III streams (Appendix B). Sunny Creek, Monie Creek, Saltery Creek, and Wimpy Fish Creek are the Class I streams affected; Monie Creek, two small watersheds south of Monie Creek, and Drinking Water Creek are the Class II streams affected.

The potential for windthrow of trees left within harvest units and riparian areas is addressed in the silvicultural prescriptions on unit cards. Stream buffers would be widened along many riparian zones through extended no-cut areas or partial cuts.

These widened buffers are designed to add windfirmness to the main buffers. The width of the zone for windfirmness is generally between 25 feet (about one line of trees above the slope break) and 50 feet, with some zones for windfirmness extending out the total site-specific tree height (85 to 140 feet). Design of the windfirm zones was based on conditions encountered in the field during reconnaissance including evidence of existing windthrow, prevailing wind directions and stand characteristics. The zones would be further refined during project layout. Despite efforts to establish windfirm buffers, we expect that some trees in the buffers would blow down. The number of windfirm trees would be incidental to the whole buffer and not create adverse impacts to the stream channel or water quality. BMP's that reduce potential adverse impacts on soil and water resources are described in the site-specific prescriptions (Appendix B).

Floodplains

Affected Environment

Several floodplains are located within the Cholmondeley Project Area. The principal floodplains are located along Clover Creek, Monie Creek, Saltery Creek and Sunny Creek. These floodplains range from one to two miles long, and up to 500 feet wide. They contain well-defined main channels, a number of overflow and side channels, and areas of beaver influenced ponds. Smaller areas of floodplains are located along many of the other streams in the project area. There are 335 acres of floodplains mapped within the Cholmondeley Project Area.

Executive Order 11988 directs Federal agencies to avoid to the extent practicable impacts to floodplains. Floodplains are one component of the Riparian Management Area delineated for the Cholmondeley Project. Timber harvest is prohibited on floodplains (Forest Plan, page 4-56).

Direct and Indirect Effects

Road construction may incur both direct and indirect effects on floodplains. Alternatives 4 and 5 each include new roads on a floodplain just upstream from Monie Lake. None of the other alternatives build roads in this area. The road length is kept to a minimum on floodplains under both alternatives. BMP's (FSH 2509.22) would be applied to maintain flow patterns and side channel habitat on the floodplain (Appendix C, Roads 2180000-2 and 2180400). Alternatives 3, 4, and 5 propose building a road in Sunny Cove but the road does not cross any floodplains.

Wetlands

Wetlands are defined as "those areas that are inundated or saturated by surface water or groundwater with a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions." (40CFR 230.41 (a)(1)).

Affected Environment

Approximately 63 percent (33,422 acres) of the Cholmondeley Project Area classifies as wetland and is grouped in the seven categories shown in Table 3-26 and described below. The majority of the wetlands are forested. Estuaries are not shown in the table because the project area shoreline excluded the estuaries from the land base. However, potential effects on estuaries are displayed.

Alpine Shrubland/Short Sedge Complex – The alpine plant communities occur mostly on poorly drained organic soils, although a portion of the scrub-shrub type occurs on shallow, well drained mineral soils. This wetland is a combination of palustrine emergent wetland and a scrub-shrub wetland. These wetlands function

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mainly as snow storage and meltwater discharge and summer habitat for terrestrial wildlife species. These wetlands are common throughout the project area above 2,500 feet in elevation.

Forested Wetland/Short Sedge Complex – The forested wetland portion of this complex typically consists of a cedar-hemlock plant community on poorly drained soils. Deer cabbage and skunk cabbage are dominant components in the understory. The forested wetland is equivalent to the palustrine forested wetland in the USFWS classification system. The short sedge portion of this complex includes poor fens and rich bogs on moderately deep and deep, very poorly drained organic soils. The short sedge wetland is equivalent to the paulstrine emergent sedge wetland in the USFWS classification system. These wetlands lie on lower footslopes or on broad ridgetops. These wetlands donate water to downslope resources and in some cases transfer water from upslope to downslope.

Forested Wetland/Forested Upland Complex – The forested wetland portion of this complex typically consists of a cedar-hemlock-blueberry-skunk cabbage plant community on poorly drained mineral soils. The forest upland portion typically consists of hemlock and blueberry dominated plant communities on steeper slopes or ridges where the forested wetlands occur in hollows on gentler slopes. These wetland habitat types typically were included in uplands on USFWS wetland maps. These wetlands lie at the very head of the transition from upland to wetland and serve to transfer hillslope groundwater to downslope stream resources.

Forested Wetlands – The forested wetlands habitat type is mapped where large contiguous areas of forested wetlands exist. Typically these wetlands are on poorly drained organic soils of varying depths. The plant community is typically cedar-hemlock-blueberry and skunk cabbage; however, some shore pine dominated plant communities may be included. The USFWS equivalent is a palustrine forested wetland. These wetlands occur on hillslopes and footslopes, and serve to transfer water to downslope resources.

Scrub-Shrub/Short Sedge Complex – This wetland habitat type consists of nonmerchantable stands of yellow cedar and mountain hemlock, sometimes with shore pine in complex with short sedge communities as described above. Almost without exception this habitat type was mapped on deep, poorly-drained organic soils. The USFWS equivalent wetlands are the scrub/shrub palustrine and palustrine emergent sedge wetland. These wetlands lie on broad plains and ridgetops and serve to store water for slow release to downslope resources. When saturated, water runs off these wetlands quickly. These wetlands lie on broad foot slope plains and may or may not be hydrologically connected to upslope resources.

Tall Sedge Fens – These wetlands include fen plant communities dominated by tall sedges, typically Sitka sedge. The soils are deep, poorly drained peats or fine alluvial sediments. This wetland is included in the palustrine emergent wetland of the USFWS classification system. Tall sedge fens often form in dewatered beaver ponds, but can occur on deep organic soils on footslopes that process a lot of hillslope water. The tall sedge fen wetlands are limited to about 61 acres on the Cholmondeley Project Area and are considered high value wetlands. These wetlands provide good wildlife forage for terrestrial animals and Vancouver Canada Geese.

Lakes and Ponds – Lakes and ponds include all open freshwater systems. They function as important habitat for most aquatic species, waterfowl, and furbearers. Lakes and ponds also provide a flood control and sediment deposition function.

Estuaries – This wetland habitat type supports mainly sedge and beach ryegrass plant communities. The soils are poorly drained silts, sands and gravels. This wetland is included in the estuarine-intertidal wetlands of the USFWS classification system. Estuaries serve as tidal/freshwater mixing zones and areas of sediment and nutrient deposition and storage. Estuaries are used by most saltwater aquatic species and by most terrestrial wildlife. There are about 57 acres of estuaries on the Cholmondeley Project area. Estuaries are considered high value wetlands due to the numerous functions they serve.

Table 3-26: Acres of Major Wetland Habitat Types on the Cholmondeley Project Area

Wetland Habitat	Acres
Alpine Shrubland/Short Sedge Complex	6,418
Forested Wetland/Short Sedge Complex	9,080
Forested Wetland/Forested Upland Complex*	10,258
Forested Wetlands	7,057
Scrub-shrub/Short Sedge Complex	3,117
Tall Sedge Fens	61
Lakes and Ponds**	2,555
Total Wetlands	33,422
Uplands	19,350
Project Area Total	52,772

* Half of the Forested Wetlands/Forested Uplands Complex is wetland.

** Lakes and Ponds are considered deep-water habitats, but are shown here for display purposes.

The Forest Plan ROD identified timber harvest on poorly drained organic soils as a concern. The ROD directed that timber harvest be avoided on the Kaikli, Karheen, Kitkun, and Maybeso soil series because scientific information was incomplete about the potential to produce 20 cubic feet of wood per acre per year on these soils. Timber harvest has been deferred where large areas of these soil series have been identified. A draft report, Tree Growth on Forested Wetlands Following Clearcutting on the Tongass National Forest (Julin et al. unpubl.), has been completed. The Tongass Leadership Team decided it is no longer necessary to defer harvest on these soils based on the information in this report (File Code 1920, April 28, 2000). Small areas of these soils are included in the Cholmondeley unit pool. However, the ID team did not re-evaluate timber harvest on these previously deferred soils.

The natural and beneficial values of each wetland type differ in terms of their benefit to wildlife and fish habitat, hydrologic properties (flood flow moderation, groundwater recharge and discharge), site productivity, and water quality. Some of the most important wetland values in Southeast Alaska include: wildlife harvest, fish production, habitat for sensitive or endangered plant and animal species, timber harvest, berry and other edible plant harvest, water quality maintenance, flood control, and recreation.

The biological significance of a wetland is related to the value of its functions and, at least in part, to the relative scarcity of the wetland type in the landscape. This is especially true in terms of biological diversity on the landscape scale. The relatively scarce tall sedge fens and estuarine salt marshes on the Cholmondeley Project Area have greater biological significance than the more common forested wetlands and short sedge fens, which are widespread throughout the landscape.

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Wetland value is largely dependent on the human use or perceived benefit to be derived from the wetland. Because human perceptions change over time, the values we place on wetland or upland ecosystems also changes over time. Estuarine salt marshes and tall sedge fens are two wetlands on the Cholmondeley Project Area that are regionally recognized for the ecological functions they provide and in part due to their scarcity. There are approximately 57 acres of estuaries on the project area. The largest estuary is at the mouth of Sunny Creek. Smaller estuaries are located at the mouths of Clover Creek, and Saltery Creek. There are about 61 acres of tall sedge fens mapped on the project area. In most cases these fens are dewatered beaver ponds that support Sitka sedge. The tall sedge fens are located at the head of Monie Lake, Swan Lake, and along the upper reaches of an unnamed creek south of Clover Creek (Barely Clover in the Watershed Analysis).

Other wetland types include the alpine shrubland/short sedge fen, forested wetlands, and scrub-shrub/short sedge complex. These wetlands cover extensive areas of the project area (Floodplains, Soils and Wetlands Resources Report, project file).

Direct and Indirect Effects

Executive Order 11990 and 33 CFR 323.3(b) require federal agencies to avoid and minimize impacts on wetlands. It is not possible to avoid all wetlands under the harvest alternatives because of their high density on the project area. High value wetlands were completely avoided during unit design and road location.

Harvesting timber from forested wetlands temporarily changes the hydrology of the site. Patric (1966) suggests an increase in water yield as a result of timber harvest. A temporary increase in soil moisture is expected until transpiration and interception surfaces are equal to pre-harvest conditions. The partial harvest areas would keep about 50 percent of the evapotranspiration surfaces intact. Tree growth on forested wetland sites is expected to be slower than on adjacent upland sites. Tables 3-27 and 3-28 display the proposed acres of timber harvest and roads on wetlands in the three major watersheds for each alternative.

Roads through wetlands can affect the flow and reach of water in the wetland. The degree of impact to the wetland depends largely on the wetland type, and the road construction materials and methods. Alternative 5 converts 1 acre of wetland to roads in Sunny Creek, 44 acres in Monie Creek, and 4 acres in Saltery Creek.

Swanston and others (pers. com. Sept. 9, 1997) found that on a gently sloping poor fen, the hydrologic effects of a forest road were limited to approximately 50 feet of the road. On more permeable soil materials, the hydrologic effects could extend further from the road. Placement of culverts and the use of coarse rock roads help to maintain flow and reach of water in wetlands.

Table 3-27: Acres of Proposed Harvest on Forested Wetlands by Wetland Habitat Type, Major Watershed, and Alternative

Alternative and Wetland Habitat	Watershed				Total Acres
	Monie Cr.	Saltery Cr.	Sunny Cr.	Other	
Alternative 2					
Forested Wetland	27	7	34	80	148
Forested Wetland/Short Sedge Complex	19	0	1	14	33
Forested Wetland/Non-Wetland Complex*	278	62	29	210	579
Proposed Harvest	324	69	64	304	761
Alternative 3					
Forested Wetland	27	7	34	80	148
Forested Wetland/Short Sedge Complex	18	0	1	14	32
Forested Wetland/Non-Wetland Complex*	259	62	29	210	560
Proposed Harvest	304	69	64	304	741
Alternative 4					
Forested Wetland	7	7	34	13	61
Forested Wetland/Short Sedge Complex	19	0	1	2	22
Forested Wetland/Non-Wetland Complex*	175	62	29	67	333
Proposed Harvest	201	69	64	82	416
Alternative 5					
Forested Wetland	27	7	34	80	148
Forested Wetland/Short Sedge Complex	19	0	1	14	33
Forested Wetland/Non-Wetland Complex*	278	62	29	210	579
Proposed Harvest	324	69	64	304	761

*Half of the Forested Wetland/Non-wetland Complex is Non-wetland.

During the road location process, estuaries and tall sedge fens were avoided. In addition to avoiding high value wetlands, functional assessments of individual wetlands were made and the road located to minimize impacts (Appendix C). The major factors considered in the functional assessment included impacts to water quality, fish or wildlife habitat, economic trade-offs, and locally scarce or unique features of the wetland.

Road locations are adjacent to high value wetlands in the Monie Creek watershed under Alternative 5. The wetlands include riparian associated tall sedge fens located near the end of the 2180-2 road and just downslope of the 2180400 road. Other important wetlands in the Monie Creek Basin occur southeast of Unit 616-012 and along the 2180300 road between Units 616-013 and 616-016 (Appendices B and C). The road systems of Sunny and Saltery Coves completely avoid the high value wetlands.

Table 3-28: Miles of Proposed Road on Wetlands and Area Affected

Alternative and Wetland Habitat	Watershed				Total	
	Monie Lake	Saltery Creek	Sunny Cove	Other	Miles	Acres
Alternative 3						
Forested Wetland	0	0	0	0.83	0.83	4
Forested Wetland/Non-Wetland Complex*	0	0	0.19	0.71	0.90	4
Roads in Wetlands	0	0	0.19	1.54	1.73	8
Alternative 4						
Forested Wetland	1.24	0	0	1.67	2.91	14
Forested Wetland/Short Sedge Complex	0.18	0	0	0.50	0.68	3
Scrub shrub/Emergent Sedge Complex	0.25	0	0	0	0.25	1
Forested Wetland/Non-Wetland Complex	3.09	0.83	0.19	1.60	5.71	28
Roads in Wetlands	4.76	0.83	0.19	3.77	9.55	46
Alternative 5						
Forested Wetland	2.82	0	0	3.03	5.85	28
Forested Wetland/Short Sedge Complex	0.2	0	0	0.69	0.89	4
Scrub shrub/Emergent Sedge Complex	0.25	0	0	0	0.25	1
Forested Wetland/Non-Wetland Complex	5.72	0.83	0.19	3.06	9.80	48
Roads in Wetlands	8.99	0.83	0.19	6.78	16.79	81

* Half of the Forested Wetland/Non-wetland complex is non-wetland.

The effects of timber harvest on the beneficial functions of forested wetlands are expected to be temporary, especially in the partial harvest units. Approximately 50 percent of the trees would remain standing after harvest in these units. In clearcut units, the effects of harvest on site hydrology would probably last longer, but are still expected to be temporary.

Fisheries

Affected Environment

Project area streams contain important anadromous and resident fish habitats. The streams support four species of anadromous salmon (pink, chum, sockeye, and coho), as well as resident coastal cutthroat trout, rainbow/steelhead trout, and Dolly Varden char. King salmon are present in marine habitats adjacent to the project area, but do not spawn in its streams. These fish species are important to the subsistence, sport and commercial fisheries of the region, and are a major food source for some wildlife species.

Sport fishing has been documented in Swan Lake, Monie Lake, and Clover Lake. The target species are primarily coastal cutthroat trout, rainbow trout, and Dolly Varden char. Salmon produced within the project area contribute to commercial fisheries (seine, troll, and drift gillnet). Sunny Creek has the highest escapement (adult anadromous fish that escape from all causes of mortality to return to streams to spawn) of pink and chum salmon within the project area. Sunny Creek is the only watershed with yearly escapement count data, targeting pink salmon. Saltery Creek and Monie Creek both have coho runs and Monie Creek also has a sockeye run. Relatively large runs of coho, steelhead, and sockeye are also present in the stream flowing into the southwest side of Clover Bay. A fish pass was constructed on Sunny Creek in 1984 to increase habitat for pink salmon.

There are 2,437 acres of lake habitat in the Cholmondeley Project Area. Many of the lakes contain resident fish, primarily Dolly Varden and cutthroat. Rainbows were stocked in Clover Lake so they are present throughout the Clover Lake drainage.

High density fish habitat areas were identified in the lower one mile of Sunny Creek (pink and chum), the lower mile of Clover Creek (coho, pink, and chum), the west end of Monie Lake (coho and sockeye), and the south end of Swan Lake at Saltery Cove (coho). These are areas where spawning and high density rearing occurs.

Direct and Indirect Effects

We expect no adverse effects on fisheries or their productivity under any alternative. Road construction and use pose the greatest potential risk to riparian resources and fish habitat. Roads affect fish habitat through the introduction of fine sediment, and rerouting of sediment-laden water. Road construction also has the potential to affect upstream fish passage through improper placement or sizing of culverts.

No riparian area harvest would occur along any Class I, II or III stream under any alternative. Removal of riparian vegetation through timber harvest affects fish habitat and fish populations by increasing sediment inputs into streams, changing stream temperature and dissolved oxygen levels, changing the input of large woody debris, and altering the delivery of water to streams. There is the possibility of loss of trees within riparian areas due to future windthrow; however, significant adverse effects to fish habitats or populations are not anticipated. The extension of buffers beyond the RMA's provide additional wind resistance and reduce windthrow potential within the RMA's.

Cumulative Effects

The potential for cumulative effects on watershed and fisheries resources varies throughout the project area. The only previous timber harvest in the project area was 132 acres in Saltery Cove and McKenzie Inlet. The effects on watershed resources were relatively minor because the watersheds are small and drain directly into saltwater, and no roads were constructed.

Though timber harvest beyond what is proposed in this analysis is not anticipated in the Cholmondeley Project Area in the foreseeable future, it is designated as suitable and available in the Forest Plan. The cumulative effects of converting a portion of the wetlands within a watershed to roads are largely unknown. Due to the high density of wetlands on the project area, the proportion of wetlands converted to roads is relatively small. If all tentatively suitable and available land on the project area is logged with a road-density-to-volume-harvested ratio similar to Alternative 5, about 342 acres of wetlands would be covered by roads. On individual watersheds, about 0.01 percent of the wetlands would be converted to roads in Sunny Creek; 14.2 percent in Monie Creek and about 0.06 percent in Saltery Creek.

The natural genesis and morphology of floodplains can be altered by changes in streamflow within a watershed and direct changes in channel location through road construction. Given the limited amount of timber harvest and road construction proposed in watersheds with floodplains, no long-term cumulative effects are expected from implementation of any of the alternatives on floodplains.

The project area contains 935 acres of land encumbered by the State of Alaska and Sealaska Corporation. Based on observations of management on conveyed lands in the area, it is likely the commercial forest land (1,320 acres) would be logged when the encumbered lands are conveyed. The watershed resources that would be affected are at the mouth of Saltery Creek and three small anadromous streams in Saltery Cove. Fish habitat conditions are expected to change as a higher percentage of a watershed is logged or roaded. These changes include: increased sediment loads which affect

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spawning habitat, increased peak flows which alter channel morphology, reduced low flows which limit habitat area during critical periods, decreased woody debris loads, reduced streambank stability, pool spacing and depth, and wider fluctuations of stream temperature which stress fish populations.

There are few unharvested watersheds in the area surrounding the Cholmondeley Project Area. The south side of Cholmondeley Sound, Sulzer Portage, Skowl Arm, and the Kasaan Peninsula have all experienced intense logging. Within the project area, logging is being proposed on 50 percent of the watersheds though the actual land area that would be logged is three percent of the project area. The result of these activities is fewer high quality refugia for fish populations during periods of stress.

The off-site effects of soil erosion from roads, soil displacements, and landslides is not easily quantifiable and no watershed-wide quantification of sediment and its effects on fisheries resources has been completed on the Cholmondeley Project Area. The Watershed Analysis (project file) used the sediment risk analysis information, air photo interpretation, and ground reconnaissance to evaluate the potential effects of timber harvest activities in each watershed. BMP's are intended to keep surface erosion to a minimum (Appendix B and C). The off-site effects of surface erosion and landslides are expected to be temporary and similar to the natural variation of sediment load and turbidity in all watersheds.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 requires consultation with the NMFS on activities that may affect Essential Fish Habitat, defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." The act promotes the protection of these habitats through review, assessment, and mitigation of activities that may adversely affect these habitats. This EIS satisfies the consultation requirements by providing a description and assessment of Essential Fish Habitat in the project area, a description of the Cholmondeley Timber Sale and its potential impacts on these habitats, and a description of the mitigation measures that will be implemented to protect these habitats.

Affected Environment

Essential Fish Habitat includes all freshwater streams accessible to anadromous fish, marine waters, and intertidal habitats. For the Cholmondeley Project, this would include all Class I streams and the marine waters and intertidal habitats along the project area shoreline (Figure 2-1). More detailed maps and fish habitat protection measures are displayed for each unit and road (Appendix B and Appendix C, respectively).

Direct and Indirect Effects

The Cholmondeley Project is unlikely to adversely affect Essential Fish Habitat for the following reasons:

1. Proposed road crossings on Class I and II streams will be constructed to provide upstream passage for fish at all life stages, and constructed when anadromous fish eggs will not be in the gravel.
2. All harvest units adjacent to Class I and II streams employ no-harvest buffers at least 100 feet wide and wider according to Forest Plan standards and guidelines.

3. Harvest adjacent to Class III streams includes slopebreak buffers to prevent detrimental effects on downstream fish habitat.
4. Log transfer facilities will be constructed in areas of low marine sea floor diversity with good flushing action.

The BMP's described on the unit and road cards provide assurance of water quality and aquatic habitat protection for all freshwater streams and marine waters affected by the project.

Recreation

Access to the interior of the project area is primarily through Saltery Cove, Spiral Cove, Trollers Cove, Clover Bay and Sunny Cove. Float plane access occasionally occurs at Monie and Clover Lakes. Access is very difficult because of the rugged terrain and dense underbrush. Recreation use in the interior of the project area is assumed to be low and most use occurs near the shoreline. The main values of the area include the scenic backdrops and solitude marketed and used by local businesses and residents, especially when they are engaged in water-based activities. Some residents of Sunny and Saltery Coves subsistence hunt in the area along with occasional hunters from Kasaan or sport hunters from Ketchikan.

The project area is noted for its many scenic coves and freshwater lakes. Opportunities exist to manage the area for developed and dispersed recreation in a semi-primitive to primitive setting. Opportunities include trails from the protected east side coves to the many lake basins and opportunities for land and water based fishing resorts.

Ninety percent of the project area is classified as Primitive (Forest Plan FEIS, page 3-102). Most of the project area is over two miles from the nearest road system located at the south end of McKenzie Inlet. This and the absence of any facilities and any other development give the area its primitive and remote character. Due to the concentration of a developed resort facility and several residences in Saltery Cove, and several residential structures in Sunny Cove, the area around these two communities is classified as Rural. Beyond these rural areas and the roaded and logged areas around McKenzie Inlet is a transition zone classified as Semi-Primitive Non-Motorized, which by definition is generally less remote than a Primitive area. Proposed harvest and road construction activities are concentrated in three areas that leave large, undeveloped areas between them.

Direct and Indirect Effects

Lands classified as Primitive in the Recreation Opportunity Spectrum (ROS) are generally 1.5 to 2.0 miles from roads and harvest units. Lands in the transition zone between the Primitive boundary and the roads and units are classified as Semi-Primitive Non-Motorized. Under Alternatives 2, 3, and 5, 18,074 acres are classified as Primitive and 16,809 acres as Semi-Primitive Non-Motorized. The combination of these areas, 34,883 acres, represents the remaining undeveloped area (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file). The undeveloped area remaining in Alternative 4 would be 40,819 acres. Approximately 26,404 acres would be classified as Primitive and 14,415 acres would be classified as Semi-Primitive Non-Motorized (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

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Scenery

The scenery of Trollers Cove would also be affected by harvest activities in the project area. The outer portion of Trollers Cove is characterized by rolling forested terrain on the eastern side and very steep forested slopes on the western side of the bay. The inner portion of the cove is a narrow secluded space with gentle rolling terrain on the east side and very steep slopes at the head of the cove and along the west shore. Rock cliffs are exposed in a few places on these south and west slopes. This area is in a natural, unaltered state except for the recreation cabin located on the south shore of the outer bay. The east and south shore is allocated to the Timber Production LUD and the west shore to the Old-growth Habitat LUD. The VQO's in the Timber Production area are Maximum Modification in the middleground and Modification in the foreground. The Old-growth Habitat VQO is Retention.

Direct and Indirect Effects

Under Alternatives 1 and 4, the scenic character described above would be retained. Under Alternatives 2, 3, and 5, Unit 616-024 would attain a VQO of Partial Retention and Unit 616-025 would have a VQO of Modification (Recreation, Roadless Areas, Wild and Scenic Rivers, and Wilderness Report, project file).

Unit 616-024 sits on a slope above the Trollers Cove cabin and is visible from the outer portion of the bay. Corridors of trees would be retained over much of this unit and the backline would be lowered and feathered. Unit 615-025 sits on the slopes above the inner part of the bay. The western half of this unit is most visible as it sits in the middle of a uniform, steep slope at the focal point of this bay. This unit is not visible from the cabin and would have no effect on the scenic quality from that vantage point (Figure 3-3). Overstory removal is the prescription for this unit, which cuts trees over 21 inches diameter-breast-height (DBH). The amount of retained structure in the more visible western portion of the unit may not be enough for the harvest to blend with the surrounding forest. Helicopter yarding allows the retention of smaller diameter trees, which may soften the visual impacts.

Heritage Resources

Evaluation of data collection needs and the survey strategy were followed (#95MOU-10-029). A review of existing archaeological information for the Cholmondeley Project Area found three historic properties. These include an early 20th century portage route associated with mining activities (Alaska Heritage Resource Survey #49-CRG-044), a reported but unverified Haida fort (AHRs #49-CRG-028, Sealaska 1975), and a protohistoric Native camp with a structure (AHRs #49-CRG-181). Goldschmidt and Haas (1946: 152-154) cite Native oral history of a "village" and associated features in Sunny Cove, a camp called "gahi" in West Arm, and a general pattern of trapping and seining throughout Chomondeley Sound. Davis and Lobdell (Heritage Resources Report, Polk EIS) revisited the Sulzer Portage site and recorded no new sites in the current project area. All of these reported cultural properties are located near the coast.

Cholmondeley Sound was also the focus of intense mining exploration and extraction during the early decades of 20th century (Roppel 1991). Though the larger mines were not in this immediate area, activities associated with them passed through the area.

Portions of the high sensitivity zone within the 'Area of Potential Effects' were selected for the Cholmondeley Project inventory (Appendix 3 #95MOU-10-029). Fifty-six kilometers of shoreline were evaluated for cultural resource potential from kayak, small boat, and on foot. Nine planned timber harvest units were evaluated through pedestrian surveys. These units were selected because of their proximity to

high sensitivity areas. The total area surveyed was approximately 420 acres (Heritage Resource Report, project file). Several of the surveyed units contain inland lakeshores. In addition, three inland lakeshores not within planned harvest units were surveyed. Other field personnel were cross-trained to recognize archaeological features so they could alert the archaeological crew of other potential sites, if found.

The Clover Bay Lodge owners identified areas of possible archaeological resources around Clover Bay. Forest Service archaeologists conducted a surface survey of the area and recorded several culturally modified trees (CMT's). They also excavated a test pit but found no cultural materials.

One significant cultural site, a historic facility associated with the terminus of the Sulzer Portage, was recorded. Two light scatters of culturally modified trees were also recorded. None of the cultural properties within the Cholmondeley Project Area will be directly affected by the planned activities. A recommendation to the SHPO of a determination of no effect was made.

Karst Resources

The harvest units planned on top of or adjacent to carbonates were inventoried by the Forest Geologist and the soil scientist (Geology, Minerals, and Karst Resources, project file). Though karst topography and subsurface drainage systems are developed in the carbonate substrate, no caves have been found. The karst lands of the project area tend to be of low to moderate vulnerability with inclusions of high vulnerability. The highly vulnerable areas are both discrete karst features and areas of intense epikarst (surface) development, generally at higher elevations. High vulnerability karst areas have been identified and removed from timber harvest consideration (Geology, Minerals and Karst Resources, project file). The drainages that feed these areas are protected. The karst resource assessment determined that the moderate and low vulnerability areas would be suitable for timber harvest given the proposed partial cut prescriptions and partial suspension yarding requirements. No roads are planned within the karst areas.

By protecting the high vulnerability karst areas, losing streams, and their drainages, there is little chance of sediment or organic material entering the karst hydrologic systems of the project area. The epikarst is moderate- to well-developed, and is sometimes visible at the surface. The soils are a mosaic of shallow organic soils, mineral soils and glacial till. The mineral and glacial soils infill or cover the epikarst channels. There should be little opportunity to move sediment and debris vertically into the karst hydrologic systems if soil disturbance is minimized. Partial suspension logging systems are required on karst lands to minimize soil disturbance (Appendix B).

Direct and Indirect Effects

Alternatives 2, 3 and 5 each propose harvest on 8.6 acres of karst in Unit 674-032 and 22.6 acres in Unit 675-032 (31.2 total acres). These areas are all moderate vulnerability karst areas. If high vulnerability inclusions are discovered during layout they would be excluded from harvest. The cumulative percentage of total karst in a harvested condition from past and proposed timber management would be 8 percent under Alternatives 2, 3 and 5. Alternative 4 does not harvest either Unit 674-032 or 675-032.

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Facilities

The Craig Ranger District Office is located approximately 35 miles northwest of the project area in Craig, Alaska. There are no logging camps or Forest Service administrative sites in the Cholmondeley Project Area. There is one Forest Service cabin at Trollers Cove in the northeast corner of the project area.

Log Transfer Facilities

The transfer of harvested timber may require that logs be placed in bays or coves, and rafted to their destination. There are no log transfer facilities (LTF's) presently in the project area.

Following a survey of the entire project area coastline, 15 sites were selected as potential LTF's. These sites were surveyed for their potential to meet the Alaska Timber Task Force Siting Guidelines for LTF's. The parameters for siting LTF's are:

1. Locate the LTF on the least productive intertidal and subtidal zones.
2. Avoid sensitive habitats.
3. Avoid shallow water.
4. Locate LTF's in straits, channels, or deep bays where the current is strong enough to disperse sunken or floating wood debris.

The three sites identified in the alternatives (see Chapter 2, Alternatives Considered in Detail) are the preferred sites, and meet the Alaska Timber Task Force Siting Guidelines for LTF's. These sites have also been approved by the U. S. Department of Interior (USDI) Fish and Wildlife Service (Marine Environment, Log Transfer sites and Related Facilities, project file). All proposed LTF's would be developed as low-angle ramp systems, which have the least resource impacts and are more economical to construct and operate. If constructed, these LTF's would be operated under the required permits. The relatively low volume expected to be transferred at each site would keep impacts low. Each LTF would affect approximately 0.2 acres of shoreline. Approximately one acre of underwater area would be affected by tree bark.

Transportation

The Cholmondeley Project Area contains no public transportation facilities (state highways, ferry dock, or airports). The project area currently has no existing roads on national forest system lands. The proposed roads for this project would not connect with the POW Island road system or the Ketchikan road system now or in the foreseeable future.

Roads are located to minimize disturbance on the land, yet provide access to resources. Thus, road locations generally follow routes of favorable terrain where practical (Table 3-29). Short-term roads (usually short spurs) are closed and/or obliterated after the completion of harvest.

Access Management - In general, the access management strategy would be to "prohibit" rather than "eliminate" road use. Access into newly entered drainages would be discouraged or eliminated to minimize resource impacts, unless there is an ongoing silvicultural need (Transportation Report, project file).

Table 3-29: Miles of Planned Road by Action Alternative

	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Planned roads	0.0	4.6	15.5	22.3
Short-term roads	0.0	0.4	3.4	3.4
Total	0.0	5.0	18.9	25.7

SOURCE: GIS

Air Quality

All of the action alternatives would have limited, short-term effects on air quality. The direct effects of timber harvest on air quality include vehicle emissions, dust from road construction, and smoke from burning limbs and logging slash on the project area or sawmills. These effects are generally indistinguishable from other local sources of airborne particulates, including other motor vehicle emissions, residential and commercial heating sources, and marine traffic. The action alternatives could result in short-term supplies of raw wood products to local mills. It is the responsibility of the mill owner or sort yard operator to ensure that mill emissions are within legal limits.

Minerals

There are no known mineral occurrences of commercial value within the Cholmondeley Project Area. Field investigations by the U.S. Bureau of Mines during 1990 located no mines, prospects, or mineral occurrences in the project area. There are 11 mining claims registered with the BLM; however, there are no patented claims in the project area.

The proposed action would have no direct or indirect effect on mineral resources. The development of new roads would indirectly increase accessibility of the area for the prospecting of mineral deposits. In general, the survey and mapping of the area would be simpler with the excavation of rock during road construction and quarry development.

Land Status

Under the Alaska Statehood Act of 1959, the State of Alaska is entitled to select for conveyance, 400,000 acres of National Forest System lands within Alaska. The State was also allowed to identify for selection more acreage than would ultimately be conveyed. Other legislation granted Alaska Native corporations similar selection rights. There are Haida Corporation and Sealaska Corporation land selections within the project area. Several small parcels of private property are also located in Saltery and Sunny Coves. The Cholmondeley Project does not propose any management actions on the selected but not yet conveyed lands.

Short-term Use and Long-term Productivity

Short-term uses, and their effects, are those that occur annually or within the first few years of project implementation. Long-term productivity refers to the capability of the land and resources to continue producing goods and services long after the project has been implemented. Under the Multiple-Use Sustained-Yield Act, and the National Forest Management Act, all renewable resources are to be managed in such a way that they are available for future generations. The harvest and use of standing timber can be considered a short-term use of a renewable resource. As a renewable resource, trees can be re-established and grown again if the long-term productivity of the land is maintained. This long-term productivity is maintained through the application of the resource protection measures described in Chapter 2, in particular those applying to the soil and water resources.

Irreversible and Irretrievable Commitments

Irreversible commitments are decisions affecting non-renewable resources such as soils, wetlands, unroaded areas, and cultural resources. Such commitments are considered irreversible because the resource has deteriorated to the point that renewal can occur only over a long period of time or at great expense, or because the resource has been destroyed or removed. The construction of roads for timber harvesting is an irreversible action because of the time it takes for a constructed road to revert to natural conditions. The conversion of old-growth forest to a managed second growth stand may also be considered an irreversible commitment.

Petroleum fuels and rock are non-renewable resources that are used to build the roads, sort yards, and log transfer facilities on the Cholmondeley Project Area. Alternative 1, the No Action alternative, does not use these resources since no timber harvest occurs.

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Alternative 2 uses fuels for layout, logging, and yarding but does not require rock since the roads and sort yards are not needed. Alternatives 3, 4, and 5 require both fuel to support the logging operations and rock to build all three types of facilities (Table 3-30).

Constructing roads in the project area would irreversibly reduce the amount of roadless area and opportunities related to the roadless character. Alternative 1 would not have these consequences. All alternatives have this effect to different degrees as discussed under Issue 5, above.

Irretrievable commitments represent opportunities foregone for the period during which resource use or production cannot be realized. Such decisions are reversible, but the production opportunities foregone are irretrievable. As an example, deferring timber harvest at this time in certain areas due to resource concerns or economics would be an irretrievable commitment of timber volume otherwise obtainable. The commitment is irretrievable rather than irreversible, because future entries could harvest those areas if they are still part of the suitable timber base.

Under all of the action alternatives, there would be an irretrievable loss of old-growth forest unless rehabilitation occurs over a period as long as 200 to 300 years. Due to increased fragmentation, other old-growth areas adjacent to harvest units would have their habitat values reduced for those species that prefer interior habitat.

Irreversible and irretrievable commitments are discussed in this analysis though generally not in those specific terms. Refer to discussions of old growth, roadless areas, undeveloped character, and recreation for more details.

The implementation of the proposed alternatives would require the expenditure of energy (consumption of fuel). The amount of energy used varies by alternative. Factors influencing the amount of fuel used include: the timber volume harvested, the type of harvest system, the amount of road construction, and sale preparation and administration. The overall logging costs are part of the Economic Efficiency Assessment earlier in this chapter.

Fuel consumption requirements were estimated as follows:

Timber Sale Preparation and Administration	1.56 gal/MBF
Cable logging	2 gal/MBF
Helicopter logging	8 gal/MBF
Load, Haul, Dump, and Tow	8 gal/MBF
Road Construction	4,000 gal/mile
Road Maintenance	20 gal/mile

Energy Requirements and Conservation Potential

Table 3-30: Estimated Fuel Consumption (Thousands of Gallons)

ACTIVITY	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Prep & admin.	0	54.9	52.6	38.0	57.5
Cable yarding	0	0	6.1	37.0	47.9
Helicopter yarding	0	281.3	245.5	46.8	103.2
Load, haul, dump, tow	0	281.3	269.8	194.8	205.6
Road construction	0	0	19.8	67.2	102.8
Road maintenance	0	0	0.1	.1	0.2
Total gallons	0	617.5	593.9	383.8	517.1
Average gal/MBF	0	17.6	17.6	15.8	14.0

Conservation Potential

The Forest Service researches new or modified techniques to conserve fuel and reduce logging costs. Cable yarding uses about 75 percent as much fuel as shovel yarding and about 25 percent as much fuel as helicopter yarding. However, helicopter yarding reduces the need for roads and thereby saves fuel used in construction, vehicle use, and long-term maintenance.

Studies, both nation-wide and locally, have shown that vehicles equipped with central tire inflation devices (low-tire-pressure equipment) decrease costs of road construction, maintenance, and timber operations. Studies on Mitkof Island indicate that 10 to 14 percent less rock was needed for road construction, which saved approximately \$450,000 (USDA 1999a). Costs of rock replacement, road maintenance, log truck fuel, and tire repair and replacement decrease using this system. The Forest Service provides a contract clause that reduces deposits for rock replacement when low-tire-pressure equipment is used because the cost reduction is so substantial.

Cable yarding equipment, fitted with mechanical or hydraulic interlocks, reduces yarding costs. With this type of equipment, the throttle and brake do not need to be applied simultaneously to get lift on the logs.

Social and Economic Effects

We do not anticipate measurable social or economic effects due to this project, beyond those disclosed in Chapter 3 under the significant issues as they relate to social economics and subsistence. The broad-based assessment of these effects was done as part of the Forest Plan analysis (Forest Plan FEIS, Chapter 3 and Appendix H). We have no indication, nor have we received any comments that lead us to believe any of the alternatives would affect any individual's civil rights (religion, race, color, national origin, age, gender, disability, marital status, sexual orientation, or political beliefs).

Available Information

Much of the Tongass National Forest resource data resides in an electronic database formatted for a geographic information system (GIS). The Forest uses GIS software to assist in the analyses of these data. GIS data is available in tabular (numerical) format, and as plots displaying data in map format. For this EIS, all the maps, and most of the numerical analyses, are based on GIS resource data.

Knowledge about many of the relationships and conditions of wildlife, fish, forests, jobs and communities is less than complete. The ecology, inventory and management of a large forest area is a complex and developing science. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interaction of resource supply, the economy, and communities is the subject matter of an inexact science. However, the basic data and central relationships are sufficiently well established in the respective sciences that the effects of the alternatives can be adequately assessed and disclosed. The deciding official can make a reasoned choice

3 Environment and Effects

Plans of Other Agencies

between the alternatives. New information would not likely reverse or nullify these relationships.

The CEQ regulations implementing NEPA require a determination of possible conflicts between the proposed action and the objectives of federal, state, and local land use plans, policies, and controls for the area. The major land use regulations of concern are Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA), the Coastal Zone Management Act (CZMA), and the State of Alaska's Forest Practices Act. See the "Findings and Disclosures" section of Chapter 2 for discussion of compliance with these laws. State compliance is also discussed at the end of Chapter 1. ANILCA Section 810 requirements pertain to subsistence; these are also discussed in the Subsistence section of this chapter.

In 1990, the State of Alaska revised the Alaska Forest Practices Act. This Act provides standards to determine consistency of federal timber sales with the Alaska Coastal Management Act. It also has specific stream buffer requirements.

The Forest Service has evaluated the alternatives to ensure that the activities and developments affecting the coastal zone are consistent with approved coastal management programs. The Forest Plan standards and guidelines, and Best Management Practices incorporated into the Cholmondeley Project meet or exceed those indicated by the Alaska Coastal Management Act and the Alaska Forest Practices Act. Layout of all proposed harvest units complies with Forest Plan standards and guidelines for riparian areas, which meet or exceed the stream buffer requirements in the Forest Practices Act. In addition, the State of Alaska Office of Governmental Coordination would conduct a preliminary consistency review of this Draft EIS.

Other Findings

The effects of the alternatives on consumers are reflected in the discussions of the issues and resources affected by the proposed alternatives. We have determined that the actions proposed in the alternatives would not adversely affect prime farm land, range land, rivers eligible for Wild and Scenic River designation, Class II airshed standards associated with the Clean Air Act, or Wilderness, nor would the actions adversely impact civil rights, lower income groups, women, or minorities. None of the alternatives would have an adverse effect on environmental justice.

Chapter 4

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2. Methodology

3. Results

4. Discussion

5. Conclusion

6. References

7. Appendix

8. Acknowledgements

9. Contact Information

Chapter 4

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Glossary

Advanced Regeneration

Natural conifer reproduction established beneath an existing forest canopy.

Access

The opportunity to approach, enter, and make use of public lands.

Access Management

Acquiring rights and developing and maintaining facilities needed by people to get to and move through public lands

Adfluvial Fish

Species or populations of fish that do not go to sea, but live in lakes, and enter streams to spawn.

Aerial Harvest Systems

Harvesting methods in which the cut logs are moved from the stump to the loading area or log deck without touching the ground, for example helicopter logging.

Alaska National Interest Lands Conservation Act (ANILCA)

Passed by Congress in 1980, this legislation designated 14 National Forest wilderness areas in Southeast Alaska. The Alaska National Interest Lands Conservation Act of December 2, 1980. Public Law 96-487, 96th Congress, 94 Stat. 2371-2551. In Section 810 requires evaluations of subsistence impacts before changing the use of these lands.

Alaska Native Claims Settlement Act (ANCSA)

Public Law 92-203, 92nd Congress, 85 Stat. 2371-2551. Approved December 18, 1971, ANCSA provides for the settlement of certain land claims of Alaska natives and for other purposes.

Allowable Sale Quantity (ASQ)

The maximum quantity of timber that may be sold in each decade from suitable scheduled lands covered by the Forest Plan.

Alluvial Fan

A cone-shaped deposit of organic and mineral material made by a stream where it runs out onto a level plain or meets a slower stream.

Alluvium

Material deposited by rivers or streams, including the sediment laid down in river beds, flood plains and at the foot of mountain slopes and estuaries.

Alpine

The biogeographic zone made up of the elevated slopes above timberline and characterized by the presence of rosette-forming herbaceous plants and low shrubby slow-growing woody plants.

Anadromous Fish

Fish which mature and spend much of their adult life in the ocean, returning to inland waters to spawn. Salmon and Steelhead are examples.

Aquatic Habitat Management Unit (AHMU)

A mapping unit that displays an identified value for aquatic resources. It is a mechanism for carrying out aquatic resource management policy. See *Stream Class*.

Background

The distant part of a landscape. The seen or viewed area located from four miles to infinity from the viewer. Individual tree crowns generally are not visible. In other words vegetative textures on hillsides are not discernable, only tones of color. (See "Foreground" and "Middleground".)

Basal Area (BA)

The area of the cross section of a tree stem, or group of trees, measured at 4.5 feet above ground; usually presented as total square feet per acre.

Beach Fringe Habitat

Habitat that occurs from the intertidal zone inland 1000 feet and islands of less than 50 acres.

Best Management Practice (BMP)

Practices used for the protection of water quality. BMPs are designed to prevent or reduce the amount of pollution from nonpoint sources or other adverse water quality impacts while meeting other goals and objectives. BMPs are standards to be achieved, not detailed or site specific prescriptions or solutions. BMPs as defined in the USDA Forest Service Soil & Water Conservation Handbook are mandated for use in Region 10 under the Tongass Timber Reform Act.

Biological Diversity (Biodiversity)

The variety of life in all its forms and at all levels. This includes the various kinds and combinations of: genes; species of plants, animals, and microorganisms; populations; communities; and ecosystems. It also includes the physical and ecological processes that allow all levels to interact and survive. The most familiar level of biological diversity is the species level, which is the number and abundance of plants, animals, and microorganisms.

Biological Potential

The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

Biomass

The total quantity, at a given time, of living organisms of one or more species per unit area or all of the species in a community.

Biotic

Refers to life, living.

Blind Lead

An area within a harvest unit that is difficult to yard (remove felled timber) with conventional cable logging systems on convex slopes.

Blowdown

See windthrow.

Board Foot (BF)

A unit of wood 12" x 12" x 1". One acre of commercial timber in Southeast Alaska on the average yields 28,000-34,000 board feet per acre (ranging from 8,000-90,000 board feet per acre). One million board feet (MMBF) would be the volume of wood covering one acre two feet thick. One million board feet yields approximately enough timber to build 120 houses or 75,555 pounds of dissolving pulp.

Buffer

Buffer--an area of trees left on the edge of or within a harvest unit to protect specific resources. The following are types of buffers used in the Cholmondeley area:

Beach buffer--a 1,000 foot slope distance buffer left along the edge of the saltwater shoreline to maintain high quality wildlife habitat.

Reasonable assurance of windfirmness (RAW) buffer--additional trees left along the edge of a buffer to block or deflect strong winds, thereby protecting trees within the buffer from windthrow. The RAW buffer can have a partial or no-cut prescription and is not considered a part of the RMA.

RMA buffer--a buffer left along both sides of a stream or lake (riparian management area) based on stream channel type and adjoining wetlands or riparian soils; also referred to as stream buffer.

Slopebreak buffer--a buffer of trees left within the slopebreak of an incised stream channel. The slopebreak is defined as the second significant break in slope above the bottom of the stream channel.

TTRA buffer--a no-cut buffer of no less than 100 feet required by the Tongass Timber Reform Act to be left on each side of all Class I streams and Class II streams which flow directly into Class I streams.

Capability

An evaluation of a resource's inherent potential for use.

Channel Type

A way of distinguishing parts of a stream system into segments that have fairly consistent physical and biological characteristics. For descriptions, see "Channel Type Field Guide", Forest Service Publication R10-MB-6.

Clearcut

The harvesting in one cut of all trees on an area. The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield.

Climax Plant Community

The final or stable biotic community in a successional series which is self-perpetuating and in dynamic equilibrium with the physical habitat; the assumed end point in succession.

Code of Federal Regulations (CFR)

A codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government.

Commercial Forest Land (CFL)

Land that is capable of producing continuous crops of timber (20 cubic feet of tree growth annually, or at least 8 MBF/acre, has not been withdrawn, can be logged without irreversible resource damage, and has reasonable assurance of restockability within 5 years.

Commercial Thinning

Thinning a stand where the trees to be removed are large enough to sell.

Connectivity

A measure of the extent that forest areas between or outside reserves provide habitat for breeding, feeding, dispersal, and movement.

Corridor

Connective links of certain types of vegetation between patches of suitable habitat which are necessary for certain species to facilitate movement of individuals between patches of suitable habitat. Also refers to transportation or utility rights-of-way.

Cover

Refers to trees, shrubs, or other landscape features that allow an animal to partly or fully conceal itself.

Critical Habitat

Specific terrain within the geographical area occupied by threatened or endangered species. Physical and biological features that are essential to conservation of the species and which may require special management considerations or protection are found in these areas.

Crown

The tree canopy. The upper part of a tree or woody plant that carries the main branch system and foliage.

Cruise

Refers to the general activity of determining timber volumes and quality as opposed to a specific method.

Cubic foot (cf)

Equivalent to a cube of wood with 1-foot sides. The cubic foot volume is a measure of the total sound wood in a tree and is a more accurate depiction of wood volume than the board foot measure. Forest Service policy is that cubic foot measure will be the basis for timber sales. Using broad regional conversion factors: 5BF ~ 1CF; 100 cubic feet = 1 cunit. 1MBF ~ 2CCF, i.e. 43 million board feet ~ 86,000 cunits.

Cultural Resources

Historic or prehistoric objects, sites, buildings, structures, and their remains resulting from past human activities.

Cumulative Effects

The impacts on the environment resulting from additional incremental impacts of past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions occurring over time.

Cutover

Areas harvested recently.

dbh (DBH)

Diameter Breast Height. The diameter of a tree measured 4 feet 6 inches from the ground.

Debris Avalanche

The sudden movement downslope of the soil mantle; it occurs on steep slopes and is caused by the complete saturation of the soil from prolonged heavy rains. Also known as a debris slide.

Debris Flow

A general term for all types of rapid movement of debris downslope.

Debris Torrents

Landslides that occur as a result of debris; avalanche materials which either dam a channel temporarily or accumulate behind temporary obstructions such as logs and forest debris.

Deer Winter Range

Locations that provide food and shelter for Sitka black-tail deer under moderately severe to severe winter conditions.

Demographic

Pertaining to the study of the characteristics of human populations, such as size, growth, density, distribution, and vital statistics.

Desired Future Condition or Goal

A concise statement that describes a desired future condition normally expressed in broad, general terms that are timeless, in that there is no specific date by which the goal is to be achieved (36 CFR 219.3).

Detritis

Material, produced by the disintegration and weathering of rocks, that has been moved from its site of origin.

Developed Recreation

Recreation that requires facilities that, in turn, result in concentrated use of an area. Facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, and buildings.

Direct Employment

The jobs that are immediately associated with the Long-Term Contract Timber Sale, including, for example, logging, sawmills, and pulp mills.

Dispersion

To disperse the effects of timber harvest by distributing harvest units more or less uniformly throughout a drainage so that increased runoff and sediment from disturbed sites will be buffered by lower levels of runoff and sediment production from surrounding undisturbed lands.

Dissected Landforms

A physical, recognizable form or feature of the earth's surface such as a mountain, hill, or valley having a characteristic shape, that in part is the result of several shallow or deeply incised drainage channels.

Distance Zone

Areas of landscapes denoted by specified distances from the observer (foreground, middleground, or background). Used as a frame of reference in which to discuss landscape characteristics of management activities.

Diversity

The distribution and abundance of different plant and animal communities and species within the area controlled by the Forest Plan.

Draft Environmental Impact Statement (DEIS)

A statement of environmental effects for a major Federal action which is released to the public and other agencies for comment and review prior to a final management decision. Required by Section 102 of the National Environmental Policy Act (NEPA).

Duff Layer

Vegetative material covering the mineral soils in forests including the fresh litter and well-decomposed organic material and humus.

Eagle Nest Tree Buffer Zone

A 330-foot radius around eagle nest trees established in an Agreement between the U.S. Fish and Wildlife Service and the Forest Service.

Ecosystem

All of the organisms in a given area interacting with the physical environment so that the flow of energy leads to an exchange of materials between living and nonliving parts within the system.

Ecotone

A transition or junction zone between two or more naturally occurring diverse plant communities (ecosystems).

Ecotype

A species of plant or animal that displays different genetic or physiological adaptations. For example, the brown bear in Southeast Alaska is the same species as the grizzly bear in interior Alaska, but the brown bear is generally larger than the grizzly.

Effects

Effects, impacts, and consequences as used in this environmental impact statement are synonymous. Effects may be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historical, cultural, economic, or social, and may be direct, indirect, or cumulative

Direct Effects: Results of an action occurring when and where the action takes place.

Indirect Effects: Results of an action occurring at a location other than where the action takes place and/or later in time, but in the reasonably foreseeable future.

Cumulative Effects: See Cumulative Effects.

Encumbrance

A claim, lien, charge, or liability attached to and binding real property.

Endangered Species

Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act. See also, threatened species, sensitive species.

Environmental Assessment (EA)

A comprehensive evaluation of alternative actions and their predictable short-term and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions. An EA is less comprehensive than an Environmental Impact Statement (EIS), and may result in a Finding of No Significant Impact; should the EA reveal significant impacts, a full EIS must then be conducted.

Ephemeral Stream

A stream that flows in direct response to rainfall and snowmelt but not during dry seasons. Its channel is above the level of the water table.

Erosion

The wearing away of the land surface by running water, wind, ice, gravity, or other geological activities.

Escapement

Adult anadromous fish that escape from all causes of mortality (natural or human-caused) to return to streams to spawn.

Estuarine Fringe Use Area

A 1,000-foot timbered zone around an estuary.

Estuary

For the purpose of this EIS process, estuary refers to the relatively flat, intertidal, and upland areas generally found at the heads of bays and mouths of streams. They are predominately mud and grass flats and are unforested except for scattered spruce or cottonwood.

Even-Aged System

A planned sequence of treatments designed to maintain and regenerate a stand with one age class. The range of tree ages is usually less than 20 percent of the rotation age. Clearcut, shelterwood, or seedtree methods produce even-aged stands.

Executive Order

An order or regulation issued by the President or some administrative authority under his or her direction.

Falldown

The difference between planned or scheduled harvest and that which is attained after implementation.

Final Environmental Impact Statement (FEIS)

The final version of the statement of environmental effects required for major federal actions under Section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement (DEIS) to include public and agency responses to the draft. The decision maker chooses which alternative to select from the Final EIS, and subsequently issues a Record of Decision (ROD).

Fiscal Year (FY)

October 1 through September 30, e.g. October 1, 1992 - September 30, 1993 = FY93.

Floodplain

That portion of a river valley, adjacent to the river channel, which is covered with water when the river overflows its banks at flood stages.

Foreground

The portion of a seen area (viewshed) approximately within ½ mile from a recreation facility, trail, highway, boat route or other use area or travel route. It is generally the area within which the branches of trees can be distinguished. See also, *Background* and *Middleground*.

Forest and Rangeland Renewable Resources Planning Act of 1976 (RPA)

Amended in 1976 by the National Forest Management Act. See RPA Assessment and Program.

Forest or Forest Land

Land currently supporting or capable of supporting forests of at least 10 percent crown closure or more. Including old growth and second-growth, and both commercial and noncommercial forest land.

Forested Wetland

A wetland whose vegetation is characterized by an overstory of trees that are 20 feet or taller.

FORPLAN

The forest planning model. A linear programming software package used to analyze planning decisions regarding land use patterns, capital investment, and timber harvest scheduling.

FSH

Forest Service Handbook.

FSM

Forest Service Manual.

Geographic Information System (GIS)

An information processing technology to input, store, manipulate, analyze, and display spatial and attribute data to support the decision-making process. It is a system of computer maps with corresponding site-specific information that can be electronically combined to provide reports and maps.

Geomorphology

The study of the forms of the land surface and the processes producing them. Also the study of the underlying rocks or parent materials and the landforms present which were formed in geological time.

Groundwater

Water within the earth that supplies wells and springs.

Guideline

A preferred or advisable course of action or level of attainment designed to promote achievement of goals and objectives.

Habitat

The sum total of environmental conditions of a specific place occupied by an organism, population, or community of plants and animals.

Habitat Capability

The estimated maximum number of fish or wildlife that can be supported by the amount and distribution of suitable habitat in an area.

Hard Snags/Soft Snags

Hard snags are dead trees that have little decay and are generally still hard wood. Soft snags are dead trees that have a considerable amount of decay and are generally soft, broken wood.

Haul out

An area of large, smooth rocks used by seals and sea lions for resting and pupping.

Humus

Substance of organic origin that is fairly but not entirely resistant to further bacterial decay.

Hydrophyte

Plants typically found in wet habitats.

IMPLAN

A computer-based system used by the Forest Service for constructing nonsurvey input/output models to measure economic input. The system includes a database for all counties in the United States and a set of computer programs to retrieve data and perform the computational tasks for input/output analysis.

Indirect Employment

The jobs in service industries that are associated with the Long-Term Contract timber sale including, for example, suppliers of logging and milling equipment.

Inoperable Timber

Timber that cannot be harvested by any proven method because of potential resource damage, extremely adverse economic considerations, or physical limitations.

Interdisciplinary Team (IDT)

A group of people with different backgrounds assembled to research, analyze, and write a project Environmental Impact Statement. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze a proposed action and its alternatives.

Invertebrates

Animals without a backbone.

Irretrievable Commitments

Losses of production or use of renewable natural resources for a period of time. For example, timber production from an area is irretrievably lost during the time an area is allocated to a no-harvest prescription; if the allocation is changed to allow timber harvest, timber production can be resumed. The production lost is irretrievable, but is not irreversible.

Irreversible Commitments

Decisions causing changes that cannot be reversed. For example, if a roadless area is allocated to allow timber harvest and timber is actually harvested, that area cannot, at a later date, be allocated to wilderness. Once harvested, the ability of that area to meet wilderness criteria has been irreversibly lost. Often applies to nonrenewable resources such as minerals and cultural resources.

Issue

A point, matter, or section of public discussion or interest to be addressed or decided.

Knutsen-Vandenburg Fund (KV)

The portion of timber sale receipts collected and used for reforestation and other renewable resource projects on the sale area.

Land Allocation

The decision to use land for various resource management objectives to best satisfy the issues, concerns and opportunities and meet assigned forest output targets.

Land Exchange

The conveyance of non-Federal land or interests to the United States in exchange for National Forest System land or interests in land.

Land Use Designation (LUD)

The method of classifying land uses presented in the Tongass Land Management Plan (TLMP). These 19 designations represent a wide range of allocations from wilderness to full commodity development.

Land Use Prescriptions

Specific management direction applied to a defined area of land to attain multiple use and other goals and objectives.

Landslides

The moderately rapid to rapid down slope movement of soil and rock materials that may or may not be water-saturated.

Large Woody Debris (LWD)

Any large piece of relatively stable woody material having a diameter of at least four inches and a length greater than three feet that intrudes into the stream channel. Also called Large Organic Debris (LOD).

Log Transfer Facility (LTF)

A facility that is used for transferring commercially harvested logs to and from a vessel or log raft, or the formation of a log raft. It is wholly or partially constructed in waters of the United States and location and construction are regulated by the 1987 Amendments to the Clean Water Act. Formerly termed "terminal transfer facility" or "log dump."

Logging Systems

Highlead: A cable yarding system, using a two-drum yarder, in which lead blocks are hung on a spar or tower to provide lift to the front end of the logs. Grabinski is a modified highlead cable system.

Aerial Logging Systems: Systems where the cut logs are moved from the stump to the loading area or log deck without touching the ground.

Live skyline/gravity carriage return: A two-drum, live skyline yarding system in which the carriage moves down the skyline by gravity; thus, is restricted to uphill yarding; the skyline is lowered to attach logs then raised and pulled to the landing by the mainline.

Live skyline/haulback required: A live skyline yarding system composed of skyline, mainline, and haulback; the carriage is pulled to the woods by the haulback; the skyline is lowered to permit the chokers to be attached to the carriage, and the turn is brought to the landing by the mainline.

Running skyline: A yarding system with three suspended moving lines, generally referred to as the main, haulback, and slack-pulling, that when properly tensioned will provide lift, travel, and control to the carriage; normally indicates a gantry type tower and a three-drum yarder.

Standing skyline: Used wherever yarding distances or span distances exceed the capability of live skyline equipment.

Multispan skyline: European equipment is commonly associated with this.

Tractor: Used to describe the full range of surface skidding equipment, designed to operate on level to downhill settings.

Shovel: A system of short-distance logging in which logs are moved from the stump to the landing by repeated swinging with a swing-boom log loader; the loader is walked off the haul road and out into the harvest unit; logs are moved and decked progressively closer to the haul road with each pass of the loader; when logs are finally decked at roadside, the same loader, or a different loader, loads out trucks. On gentle ground, logs are either heeled and swung or dragged by the boom as it rotates; larger log length and tree length logs are usually dragged to maintain machine stability. Soils should be moderate to well drained and side slopes must be less than 20 percent; passes or stripes should be kept to a maximum of four.

Helicopter: Flight path cannot exceed 40 percent downhill or 30 percent uphill; landings must be selected so there is adequate room for the operation and so that the helicopter can make an upwind approach to the drop zone.

A-Frame: Beach fringe timber which is logged with a float mounted yarder typically rigged in a highlead configuration for direct A-frame yarding.

Cold-deck and swing: Planned to access areas not suitable for skyline operations.

Logging System Transportation Analysis Plan (LSTA)

Interdisciplinary design and mapping of all potential timber harvest units, including associated logging and transportation systems, within a project area.

MBF

Thousand board feet.

MMBF

A million board feet net sawlog and utility volume.

MMCF

A million cubic feet net sawlog and utility volume.

Managed stand

A stand of trees in which stocking level control is applied to achieve maximum growth.

Management Indicator Species (MIS)

Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.

Management Prescriptions

Method of classifying land uses presented in the Tongass Land Management Plan (TLRMP 1997, modified 1999). Replaces the Land Use Designations (LUDs) originally presented in TLMP.

Management Requirement

Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water and diversity, to be met in accomplishing National Forest System goals and objectives. (see 36 CFR 219.17)

Marine Benthic Habitat

The area occupied by the aggregate of organisms living at or on the bottom of a water body.

Maritime Climate

Weather conditions controlled by an oceanic environment characterized by small annual temperature ranges and high precipitation.

Mass Failure

The downslope movement of a block or mass of soil. This usually occurs under conditions of high-soil moisture and does not include individual soil particles displaced as surface erosion.

McGilvery (Soil series)

Soil series which represents the only well-drained organic soil found in the Ketchikan Area. It is composed of a thin surface layer (less than 20 inches deep) of organic material overlying bedrock. These soils are associated with cliffs and rock outcrops, and are sensitive to disturbance.

Mean Annual Increment (MAI)

The total volume of a stand divided by its age.

Memorandum of Understanding (MOU)

A legal agreement between the Forest Service and others agencies resulting from consultation between agencies that states specific measures the agencies will follow to accomplish a large or complex project. A memorandum of understanding is not a fund obligating document.

Microclimate

The temperature, moisture, wind, pressure, and evaporation (climate) of a very small area that differs from the general climate of the larger surrounding area.

Middleground

The visible terrain beyond the foreground where individual trees are still visible but do not stand out distinctly for the landscape; area located from 1/4 to 5 miles from the viewer. See also, Foreground and Background.

Mid-market analysis

The value and product mix represented at the quarter in which the pond log value (end-product selling price less manufacturing cost) for the species and product mix most closely matches the point between the ranked quarters of the Alaska Index Operation pond value, adjusted to Common Year Dollars, where one half of the harvest of timber from the Tongass National Forest has been removed at higher values and one half of the timber has been removed at lower values, during the period from 1979 to the current quarter (FSH 2409.22 R10 Chapter 531.1-2).

Mineral Soils

Soil consisting predominately of, and having its properties determined by, mineral material.

Minimum Viable Population

A population with the estimated numbers and distribution of reproductive individuals to maintain the population over time.

Mining Claims

A geographic area of the public lands held under the general mining laws in which the right of exclusive possession is vested in the locator of a valuable mineral deposit.

Mitigation Measures

Measures designed to counteract environmental impacts or to make impacts less severe. These may include: avoiding an impact by not taking a certain action or part of an action; minimizing an impact by limiting the degree or magnitude of an action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or compensating for the impact by replacing or providing substitute resources or environments.

Model

A representation of reality used to describe, analyze, or understand a particular concept. A model may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations. A model has limits to its effectiveness, and is used as one of several tools to analyze a problem.

Modular Bridge

A portable bridge constructed of components that can be readily assembled and disassembled for movement from one site to another.

Monitoring

A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized. Monitoring can occur at different levels: to confirm whether mitigation measures were carried out in the manner called for, to determine whether the mitigation measures were effective, or to validate whether overall goals and objectives were appropriate. Different levels call for different methods of monitoring.

Multiple-aged Stands

An intermediate form of stand structure between even and uneven-aged stands. These stands generally have two or three distinct tree canopy levels occurring within a single stand.

Multiple Use

The management of all the various renewable resources of the National Forest System to be used in the combination that will best met the needs of the American people.

Muskeg

In Southeast Alaska a type of bog that has developed over thousands of years in depressions or flat areas on gentle to steep slopes. Also called peatlands.

Mycorrhizae

A mutualism between plant roots and certain kinds of fungi. The plants exude carbon compounds to the fungi and the fungi provide the plants with soil nutrients, such as phosphorus.

National Environmental Policy Act (NEPA) of 1969

An Act to declare a national policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, Agric. Handb. 453. USDA Forest Service, 359 p.).

National Forest Management Act (NFMA)

A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development.

National Wild and Scenic River System

Rivers with outstanding scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values designated by Congress under the Wild and Scenic Rivers Act of 1968 and amended in 1986, for preservation of their free-flowing condition. May be classified and administered under one or more of the following categories: Wild, Scenic, and/or Recreational.

Native Selection

Application by Native corporations and individuals to a portion of the USDI Bureau of Land Management for conveyance of lands withdrawn in fulfillment of Native entitlements established under ANSCA.

Net Sawlog Volume

Tree or log volume suitable in size and quality to be processed into lumber. In Southeast Alaska, depending on the market, the volume may be processed as pulp or lumber.

No-action Alternative

The most likely condition expected to exist in the future if current management direction were to continue unchanged.

Non-commercial Forest Land

Land with more than 10 percent cover of commercial tree species but not qualifying as Commercial Forest land.

Noncommercial species

Species that have no economic values at this time nor anticipated timber value within the near future.

Non-Forest Land

Land that has never supported forests and lands formerly forested but now developed for such nonforest uses as crops, improved pasture, etc.

Notice of Intent (NOI)

A notice printed in the Federal Register announcing that an Environmental Impact Statement will be prepared. The NOI must describe the proposed action and possible alternatives, describe the agency's proposed scoping process, and provide a contact person for further information.

Offering Area

A geographic area identified by the Forest Service within which the offering specifications are outlined to meet the requirements of a contract. One or more offering areas may be identified within all or a portion of a project area.

Old Growth

Ecosystems distinguished by old trees and related structural attributes. Old-growth forests are characterized by larger tree size, higher accumulations of large dead woody material, multiple canopy layers, different species composition, and different ecosystem function. The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context. For the displays in this project, it is those areas typed as Volume Class 4, 5, 6, and 7.

Organic Soils

Soils that contain a high percentage (generally greater than 20 to 30 percent) of organic matter throughout the soil depth.

Parent Material

The unconsolidated and partially weathered material (or the C Horizon) from which upper layers of soil developed.

Partial Cut

Method of harvesting trees where any number of live stems are left standing in any of various spatial patterns; not clearcutting.

Patch

A non-linear surface area differing in appearance from its surroundings.

Payments to States

A fund consisting of approximately 25 percent of the gross annual timber receipts received by the National Forests in that state. This is returned to the State for use on roads and schools.

Peak flow

The highest discharge of water recorded over a specified period of time at a given stream location. Often thought of in terms of spring snowmelt, summer, fall, or winter rainy season flows. Also called maximum flow.

Planning Record

A system that records decisions and activities that result from the process of developing a forest plan, revision, or significant amendment.

Plant Association

A basic unit of vegetation classification based on land management potential, species composition, successional patterns, and the climax plant community.

Plant Communities

Aggregations of living plants having mutual relationships among themselves and to their environment. More than one individual plant community.

Pole

An immature tree between 5 and 9 inches diameter breast height.

Population Viability

Ability of a population to sustain itself.

Precommercial Thinning

The practice of removing some trees of sapling size to reduce stocking and improve tree growing space; trees will grow faster due to reduced competition for nutrients, water, and sunlight.

Present Net Value (PNV)

The difference between the benefits and costs associated with the alternatives.

Pre-haul Maintenance

Work performed prior to use of a road for timber harvest activities; includes blading, shaping and brush removal.

Primary Succession

Vegetation development is initiated on newly formed soils or upon surfaces exposed for the first time (as by landslides) which have, as consequence, never borne vegetation before.

Process Group

A combination of similar channel types based on major differences in landform, gradient, and channel shapes. A full description of process groups is located in Appendix D of the Forest Plan.

Public Participation

Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service activities.

Receipts

Those priced benefits for which money will actually be paid to the Forest Service: recreation fees, timber harvest, mineral leases, and special use fees.

Record of Decision

A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not.

Recreation Opportunity Spectrum (ROS)

A system for planning and managing recreation resources that categorizes recreation opportunities into seven classes. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area and the relative density of recreation use. The seven classes are:

Primitive: An unmodified environment generally greater than 5,000 acres in size and located generally at least 3 miles from all roads and other motorized travel routes. A very low interaction between users (generally less than three group encounters per day) results in a very high probability of experiencing solitude, freedom, closeness to nature, tranquility, self-reliance, challenge, and risk. Evidence of other users is low. Restrictions and controls are not evident after entering the land unit. Motorized use is rare.

Semi-Primitive Non-motorized: A natural or natural-appearing environment generally greater than 2,500 acres and generally located at least 1/2 mile (greater or less depending on terrain and vegetation, but no less than 1/4 mile), but not further than 3 miles from all roads and other motorized travel routes. Concentration of users is low (generally less than 10 group encounters per day), but there is often evidence of other users. There is a high probability of experiencing solitude, freedom, closeness of nature, tranquility, self-reliance, challenge, and risk. There is a minimum of subtle on-site controls. No roads are present in the area.

Semi-Primitive Motorized: A natural or natural-appearing environment generally greater than 2,500 acres in size and generally located within 1/2 mile of primitive roads and other motorized travel routes used by motor vehicles; but not closer than 1/2 mile (greater or less, depending on terrain and vegetation, but no less than 1/4 mile) from better-than-primitive roads and other motored travel routes. Concentration of users is low (generally less than 10 group encounters per day), but there is often evidence of other users. There is a moderate probability of experiencing solitude, closeness to nature, and tranquility along with a high degree of self-reliance, challenge, and risk in using motorized equipment. Local roads may be present, or along saltwater shorelines there may be extensive boat traffic.

Roaded Natural: Resource modification and utilization are evident, in a predominantly naturally appearing environment generally occurring within 1/2 mile (greater or less depending on terrain and vegetation, but no less than 1/4 mile) from better-than-primitive roads and other motorized travel routes. Interactions between users may be moderate to high (generally less than 20 group encounters per day), with evidence of other users prevalent. There is an opportunity to affiliate with other users in developed sites, but with some chance for privacy. Self-reliance on outdoor skills is only of moderate importance with little opportunity for challenge and risk. Motorized use is allowed.

Roaded Modified: Vegetative and landform alterations typically dominate the landscape. There is little on-site control of users except for fated roads. There is moderate evidence of other users on roads (generally less than 20 group encounters per day), and little evidence of others or interactions at campsites. There is opportunity to get away from others, but with easy access. Some self-reliance is required in building campsites and use of motorized equipment. A feeling of independence and freedom exists with little challenge and risk. Recreation users will likely encounter timber management activities.

Rural: The natural environment is substantially modified by land use activities. Opportunity to observe and affiliate with other users is important as is convenience of facilities. There is little opportunity for challenge and risk and self-reliance on outdoor skills is of little importance. Recreation facilities designed for group use are compatible. Users may have more than 20 group encounters per day.

Urban: Urbanized environment with dominant structures, traffic lights and paved streets. May have natural appearing backdrop. Recreation places may be city parks and large resorts. Opportunity to observe and affiliate with other users is very important as is convenience of facilities and recreation opportunities. Interaction between large numbers of users is high. Outdoor skills, risk, and challenge are unimportant except for competitive sports. Intensive on-site controls are numerous.

Regeneration

The process of establishing a new crop of trees on previously harvested land.

Regional Forester

The Forest Service official responsible for administering a single region.

Regional Guide

The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974 as amended. It guides all natural resource management activities and establishes management standards and guidelines for the National Forest System lands within a given region.

Rehabilitation

Actions taken to protect or enhance site productivity, water quality, or other values for a short period of time.

Reserved Lands

Lands that have been withdrawn from the timber base by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service.

Resident Fish

Fish that are not anadromous and that reside in freshwater during their entire lifecycle. Resident fish include non-anadromous Dolly Varden char and cutthroat trout.

Resource values

The tangible and intangible worth of forest resources.

Responsible Official

The Forest Service employee who has the delegated authority to make a specific decision.

Restricted Harvest

The action of apportioning the supply of a resource to specific uses or to particular persons or organizations.

Restoration

The long-term placement of land back into its natural condition or state of productivity.

Retained structure

Merchantable or submerchantable trees and snags that are left within the harvest unit to provide biological habitat components over the next management cycle.

Revegetation

The re-establishment and development of a plant cover. This may take place naturally through the reproductive processes of the existing flora or artificially through the direct action of reforestation or reseeding.

Riparian Area

The area including a stream channel, lake, or estuary bed, the water itself, and the plants that grow in the water and on the land next to the water.

Roads

Arterial: Roads usually developed and operated for long-term land and resource management purposes to constant service.

Collector: Collects traffic from Forest local roads; usually connects to a Forest arterial or public highway.

Local: Provides access for a specific resource use activity such as a timber sale or recreational site, although other minor uses may be served.

Preplanned: Roads planned in a prior EIS.

Temporary: (short-term roads) For National Forest timber sales, temporary roads are constructed to harvest timber on a one-time basis. These logging roads are not considered part of the permanent Forest transportation network and have stream crossing structures removed, erosion measures put into place, and the road closed to vehicular traffic after harvest is completed.

Roadless Area

An area of undeveloped public land within which there are no improved roads maintained for travel by means of motorized vehicles intended for highway use.

Rotation

The planned number of years between the formation or the regeneration of a crop or stand of trees and its' final cutting at a specified stage of maturity. On the Tongass this is estimated at 100 or 200 years.

Rotation Age

The age of a stand when harvested at the end of a rotation.

RPA Assessment and Program

The RPA Assessment is prepared every ten years and describes the potential of the nation's forests and rangelands to provide a sustained flow of goods and services. The RPA Program is prepared every five years to chart the long-term course of Forest Service management of the National Forests, assistance to State and private landowners, and research. They are prepared in response to Sections 3 and 4 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) (16 U.S.C. 1601).

Salvage Sale

A timber sale to use dead and down timber and scattered poor-risk trees that would not be marketable if left in the stand until the next scheduled harvest.

Sawlog

That portion of a tree that is suitable in size and quality for the production of dimension lumber collectively known as sawtimber.

Scheduled Timber Harvests

Timber harvests done as part of meeting the allowable sale quality.

Scoping Process

Early and open activities used to determine the scope and significance of a proposed action, what level of analysis is required, what data is needed, and what level of public participation is appropriate. Scoping focuses on the issues surrounding the proposed action, and the range of actions, alternatives, and impacts to considered in an EA or an EIS.

Scrub-Shrub Wetland

Wetlands dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. In Southeast Alaska this includes forested lands where trees are stunted because of poor soil drainage.

Second Growth

Forest growth that has become established following some disturbance such as cutting, serious fire, or insect attack; even-aged stands that will grow back on a site after removal of the previous timber stand.

Secondary Succession

The process of re-establishing vegetation after normal succession is disrupted by fire, cultivation, lumbering, windthrow, or any similar disturbance.

Sediment

Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface.

Seed Tree

Small number of seed-bearing trees left singly or in small groups after timber harvest to provide seed for regeneration of the site.

Selective Cutting

The annual or periodic removal of trees (particularly the mature), individually or in small groups from an uneven-aged forest to achieve the balance among diameter classes needed for sustained yields, and in order to realize the yield, and establish a new crop of irregular constitution.

Note: The improvement of the Forest is a primary consideration.

Sensitive Species

Plant and animal species that are susceptible or vulnerable to activity impacts or habitat alterations. Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on a non-official State list, or that are recognized by the regional forester as needing special management to prevent placement on Federal or state lists.

Seral

Early stage of succession.

Shade Tolerance

Plant species physiological growth adaptation to shade conditions; shade tolerant species such as western hemlock are able to live in shaded conditions whereas shade intolerant species such as spruce are not adapted to shaded conditions.

Shelterwood Cutting

A harvest method in which most of the trees are removed in an initial entry and some trees are left to naturally reseed the area and provide protection to new seedlings that establish on the site. A second entry is conducted later to remove the remaining trees.

Silvicultural practices

Management techniques used to modify, manage, and replace a forest over time. Silvicultural practices are classified according to the method of carrying out the process (shelterwood, seed tree, clear-cut, commercial thinning, etc.).

Silviculture

The art, science, and practice of controlling the establishment, composition, structure, and growth of trees and other vegetation in forest stands.

Single-tree selection

A cutting method to develop and maintain uneven-aged stands by removal of selected trees from specified age classes over the entire stand area in order to meet a predetermined goal of age distribution and species in the remaining stand.

Site Index

A measure of a forest areas relative productive capacity for tree growth. Measurement of site index is based on height of dominant trees in a stand at a given age.

Site Productivity

Production capability of specific areas of land.

Slope Distance

Distance measured along the contour of the ground.

Snag

A standing dead tree, usually greater than 5 feet tall and 6 inches in diameter at breast height.

Soil Productivity

The capacity of a soil, in its normal environment, to produce a specific plant or sequence of plants under a specific system of management.

Soil Quality Standards

Standards that are a combination of 1) "threshold" values for severity of soil property alteration, or significant change in soil properties conditions, and 2) areal extent of disturbance.

Soil Resource Inventory (SRI)

An inventory of the soil resource based on landform, vegetative characteristics, soil characteristics, and management potentials.

Special Habitats

Structural elements of ecosystems. These may include, but are not limited to: snags, spawning gravels, fallen trees, aquatic reefs, caves, seeps, and springs.

Special Use Authorization

A permit, term permit, temporary permit, lease, or easement that allows occupancy or use of, or rights and privileges on National Forest System lands.

Special Use Permit

Permits and granting of easements (excluding road permits and highway easements) authorizing the occupancy and use of land.

Split Yarding

The process of separating the direction of timber harvest yarding into opposite directions.

Stand (Tree Stand)

An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas.

Standard

A course of action or level of attainment required by the forest plan to promote achievement of goals and objectives.

State Historic Preservation Officer (SHPO)

State appointed official who administers Federal and State programs for cultural resources.

State Selection

Application by Alaska Department of Natural Resources to the USDI Bureau of Land Management for conveyance of a portion of the 400,000-acre State entitlement from vacant and unappropriated National Forest System lands in Alaska, under the Alaska Statehood Act of 1959 (Public Law 85-508, 72 Stat. 340).

Stocking

The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Stream Class

A means to categorize stream channels based on their fish production values. Also known as Aquatic Habitat Management Unit (AHMU) Class. Four stream classes defined by the Forest Plan are as follows:

Class I: Streams and lakes with anadromous or adfluvial fish habitat; or high quality resident fish waters listed in Appendix 68.1, Region 10 Aquatic Habitat management Handbook (FSH 2609.24), June 1986; or habitat above fish migration barriers known to be reasonable enhancement opportunities for anadromous fish.

Class II: Streams and lakes with resident fish populations and generally steep (6-15 percent) gradient (can also include streams from 0-5 percent gradient) where no anadromous fish occur, and otherwise not meeting Class I criteria. These populations have limited fisheries values and generally occur upstream of migration barriers or have other habitat features that preclude anadromous fish use.

Class III: Perennial and intermittent streams with no fish populations but which have sufficient flow or transport sufficient sediment and debris to have an immediate influence or downstream water quality or fish habitat capability.

These streams generally have bankfull widths greater than 5 feet and are highly incised into the surrounding hillslope.

Class IV: Intermittent, ephemeral, and small perennial channels with insufficient flow or sediment transport capabilities to have an immediate influence on downstream water quality or fish habitat capability. These streams generally are shallowly incised into the surrounding hillslope.

Non-streams: Rills and other watercourses, generally intermittent and less than 1 foot in bankfull width, little or no incisement into the surrounding hillslope, and with little or no evidence of scour.

Structural Diversity

The diversity of forest structure, both vertically and horizontally, which provides for a variety of forest habitats such as logs and multi-layered forest canopy for plants and animals.

Stumpage

The value of timber as it stands uncut in terms of dollar value per thousand board feet.

Subsistence

Section 803 of the Alaska National Interest Lands Conservation Act defines subsistence use as, "the customary and traditional uses by rural Alaska residents of wild renewable resources for direct, personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

Subsistence Use Area

Important Subsistence Use Areas include the "most reliable" and "most often hunted" categories from the Tongass Resource Use Cooperative Survey (TRUCS) and from subsistence survey data from ADF&G, the University of Alaska, and the Forest Service, Region 10. Important use areas include both intensive and extensive use areas for subsistence harvest of deer, furbearers, and salmon.

Succession

A series of dynamic changes by which one group of organisms succeeds another through stages leading to a potential natural community or climax. The process of plant community development after disturbance involves changes in species composition over time.

Suitable Forestland

Commercial forestland identified as having the biological capability to sustain long-term timber production and administratively designated for such production.

Suspended Sediment

The very fine soil particles that remain in suspension in water for a considerable period of time without contact with the stream or river channel bottom.

Sustained Yield

The amount of renewable resources that can be produced continuously at a given intensity of management.

Tentatively Suitable Forest Land

Forest land that is producing or is capable of producing crops of industrial wood and: (a) has not been withdrawn by Congress, the Secretary of Agriculture or the Chief of the Forest Service; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions; (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within 5 years after final harvest; and (d) adequate information is available to project responses to timber management activities.

Terrestrial Ecosystems

Plant communities that are not dependent on a perpetual source of water to grow.

Thinning

The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may also be done to change the characteristics of a stand or wildlife or other purposes. Thinning may be done at two different stages.

Threatened Species

Plant or animal species which is likely to become endangered throughout all or a significant portion of its range within the foreseeable future, as defined in the Endangered Species Act of 1973, and which has been designated in the Federal Register by the Secretary of the Interior as a threatened species. (See also, endangered species, sensitive species.)

Threshold

The point or level of activity beyond which an undesirable set of responses begins to take place within a given resource system.

Tiering

Eliminating repetitive discussions of the same issue by incorporating by reference. The general discussion in an environmental impact statement of broader scope; e.g., this document is tiered to the Tongass Land Management Plan, as amended.

Timber Appraisal

Establishing the fair market value of timber by taking the selling value minus manufacturing costs, the cost of getting logs from the stump to the manufacturer, and an allowance for profit and risk.

Timber Classification

Forested land is classified under each of the land management alternatives according to how it relates to be management of the timber resource. The following are definitions of timber classifications used for this purpose.

Nonforest: Land that has never supported forests and land formerly forested where use for timber production is precluded by development or other uses.

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Forest: Land at least 10-percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

Suitable or suitable available: Land to be managed for timber production on a regulated basis.

Unsuitable: Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness), or identified as inappropriate for timber production in the Forest planning process.

Commercial forest: Forest land tentatively suitable for the production of continuous crops of timber and that has not been withdrawn.

Timber Dispersion

When an opening created from a final timber harvest is no longer considered an opening for the purpose of scheduling adjacent timber harvest. This is often expressed as the maximum amount of disturbance in a watershed at any given time.

Timber Harvest Unit

A portion of an Offering Area within which the Forest Service specifies for harvest all or part of the timber to meet the requirements of a timber sale contract.

Timber Stand Improvement (TSI)

All noncommercial intermediate cutting and other treatments to improve composition, condition, and volume growth of a timber stand.

Tongass Land Management Plan (TLMP)

The 10-year land allocation plan for the Tongass National Forest that directs and coordinates planning, the daily uses, and the activities carried out within the forest. Currently under revision. Also referred to in this EIS as the Forest Plan.

Tongass Resource Use Cooperative Survey (TRUCS)

A study on subsistence uses which was used for evaluating the effects of the proposed action in this EIS.

Traffic Service Levels

Traffic characteristics and operating conditions that are used in setting road maintenance levels.

Two-aged system

A planned sequence of treatments designed to maintain and regenerate a stand with two age classes.

Understory

The trees and shrubs in a forest growing under the canopy or overstory.

Uneven-Aged Management

Management techniques that result in the creation of stands that exhibit a range of diameter or age classes.

Unsuitable

Forest land withdrawn from timber utilization by statute or administrative regulation; for example, wilderness, or identified as not appropriate for timber production in the forest planning process.

Utility Logs

Those logs that do not meet sawlog grade but are suitable for production of firm useable pulp chips.

VAC

See Visual Absorption Capability.

Value Comparison Unit (VCU)

Areas which generally encompass a drainage basin containing one or more large stream systems; boundaries usually follow easily recognizable watershed divides. Established to provide a common set of areas where resource inventories could be conducted and resource interpretations made.

Viable Population

The number of individuals of a species required to ensure the long-term existence of the species in natural, self-sustaining populations adequately distributed throughout their region.

Viewshed

An expansive landscape or panoramic vista seen from a road, marine water way, or specific viewpoint.

Visual Quality Objectives (VQO)

Measurable standards reflecting five different levels of landscape alteration based upon on the degree to which the alteration repeats the form, line, color and texture and patterns of the natural landscape. The five categories of VQOs are:

Preservation: Permits ecological changes only. Applies to wilderness areas and other special classified areas. Management activities are generally not allowed in this setting.

Retention: Provides for management activities that are not visually evident to the casual Forest visitor.

Partial Retention: Management activities may be evident but remain visually subordinate to the natural landscape.

Modification: Management activities may visually dominate the characteristics landscape. However, activities must borrow from naturally established form-line color and texture so that the visual characteristics resemble natural occurrences within the surrounding area when viewed in the middleground distance.

Maximum Modification: Management activities may dominate the landscape but should appear as a natural occurrence when viewed as background.

V-Notches

A deeply incised valley along some waterways that would look like a "V" from a cross-section. These abrupt changes in terrain features are often used as harvest unit or yarding boundaries.

Volume

Stand volume based on standing net board feet per acre by Scribner Rule.

Volume Class

Classification system used to differentiate timber stands into similar average volume per acre categories or strata.

Volume strata

Divisions of old-growth timber volume derived from the interpreted timber type data layer (TIMTYP) and the common land unit data layer (CLU). Three strata (low, medium, and high) are recognized in the Forest Plan.

Watershed

A geographic area of land, water and biota within the confines of a drainage divide. The total area above a given point of a water body that contributes flow to that point.

Wetland

Areas that are inundated by surface or groundwater frequently enough to support vegetation that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include: swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds. See the TLMP (1997) pgs. 3-318 and 3-321 for detailed discussion on wetland type definitions.

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Wilderness

Areas designated by congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or a primitive and unconfined type of recreation; areas of at least 5,000 acres are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest. In Alaska, Wilderness has been designated by ANILCA and TTRA.

Wildlife Analysis Area (WAA)

A division of land used by the Alaska Department of Fish and Game for wildlife analysis.

Wildlife Habitat

The locality where a species may be found and where the essentials for its development and sustained existence are obtained.

Wildlife Habitat Management Unit (WHMU)

An area of wildlife habitat identified during the IDT process as having values important to wildlife.

Windfirm trees

Trees that have been exposed to the wind throughout their life and have developed a strong root system or trees that are protected from the wind by terrain features.

Windthrow

The act of trees being uprooted by the wind. Three types of windthrow include: endemic, where individual trees are blown over; catastrophic, where a major windstorm can destroy hundreds of acres; and management related, where the clearing of trees in an area make the adjacent standing trees vulnerable to windthrow.

Winter Range

An area, usually at lower elevation, used by big game during the winter months; usually smaller and better defined than summer ranges.

Withdrawal

The withholding of an area of Federal land from settlement, sale, location, or entry under some or all of the general land laws for the purpose of limiting activities under those laws in order to maintain other public values in the area.

Yarding

Hauling timber from the stump to a collection point.

Yield Tables

Tables that estimate the level of outputs that would result from implementing a particular activity. Usually referred to in conjunction with FORPLAN input or output. Yield tables can be developed for timber volumes, range production, soil and water outputs, and other resources.

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Distribution List

List of Agencies, Organizations, and Persons to Whom Copies of this Draft Environmental Impact Statement Were Sent

Agencies

ADEC Commissioner
 ADF&G Commissioner
 ADF&G, Ketchikan Area Biologist
 Bill Hanson, ADF&G, Division of Habitat and Restoration
 Advisory Council on Historic Preservation, Director, Planning and Review
 AK Dept. of Environmental Conservation
 AK Dept. of Natural Resources, Coastal Regional Mgr.
 AK Dept. of Natural Resources, SE Regional Mgr.
 Deputy Assistant Secretary of Defense
 District Ranger, Craig Ranger District
 District Ranger, Hoonah Ranger District
 District Ranger, Juneau Ranger District
 District Ranger, Ketchikan-Misty Ranger District
 District Ranger, Petersburg Ranger District
 District Ranger, Sitka Ranger District
 District Ranger, Thorne Bay Ranger District
 District Ranger, Wrangell Ranger District
 District Ranger, Yakutat Ranger District
 Federal Highway Administration, Regional Administrator
 Federal Railroad Administration, Office of Transportation and Regulatory Affairs
 Federal Railroad Administration, Research and special programs Administration
 Frederick Norbury, Director, USDA Forest Service – Region 10
 Interstate Commerce Commission, Chief, Energy & Environment
 Michiel Holley, US Army Corps. Of Engineers
 Mike Turek, ADF&G, Division of Subsistence
 National Park Service, Alaska Region
 NOAA NEPA Coordinator
 Ralph Thompson, US Army Corps. Of Engineers
 Richard Enriquez, US Fish and Wildlife Service
 Tom Paul, ADF&G
 US Air Force, Deputy Assistant Secretary
 US Army Corps. Of Engineers
 US Coast Guard, Environmental Impact Branch
 US Dept. of Energy, Office of Environmental Compliance
 US Dept. of Housing and Urban Development, Environmental officer
 US Dept. Of Interior, Bureau of Land management
 US Dept. Of Interior, Office of Environmental Policy and Compliance
 US Dept. of Transportation, Assistant Secretary for Policy
 US Environmental Protection Agency, Alaska Region
 US Environmental Protection Agency, EIS Filing Section
 US Naval Observatory
 US Navy, Office of Chief of Navy Operations
 USDA APHIS PPD/EAD Deputy Director
 USDA Forest Service, Directory of Ecosystem Management
 Coordination
 USDA Forest Service, Tongass National Forest Regional Forester
 USDA Forest Service, Tongass National Forest, Karryl Krieger

USDA Forest Service, Tongass National Forest, Larry Lunde
 USDA Forest Service, Tongass National Forest, Kathy Peterson
 USDA Forest Service, Tongass National Forest, Dennis Rogers
 USDA Forest Service, Tongass National Forest, Winifred O. Weber
 USDA National Agricultural Library
 USDA Natural Resources Conservation Service
 USDA Office of Civil Right, Policy, and Planning
 USDA OPA Publicatons Stockroom
 David Allen, Regional Director, US Dept. Of Interior, Fish & Wildlife
 Steve Brockmen, US Fish & Wildlife Service
 Bob Chadwick, ADF&G
 Dept. of Commerce & Economic Development
 Vickie Davis, US Fish & Wildlife Service
 DEC, Non-pt. Source Water Pollution Control
 Carol Denton, ADF&G
 Margaret Edens, ADF&G
 Energy and Interstate Commerce Commission
 Environmental Protection Agency, Office of Federal Activities
 Federal Aviation Administration, Office of Regional Director
 FERC, Environmental Compliance Branch
 Jim Ferguson, Alaska Dept. Of Env. Conservation
 Lana Flanders, ADF&G
 General Services Administration, Office of Planning & Analysis
 Linda Glover, Naval Oceanography Division
 Mike Haddix, ADF&G
 Kevin Hanley, Alaska Dept. Of Env. Conservation
 Janet E. Hohn, Acting Field Supervisor, US Dept. of Interior
 Roger D. Snippen, CEO, Huna Totem Corporation
 Moira Ingle, ADF&G
 Klawock Fish & Game Advisory Committee
 Henrietta Kato, President, Klawock Heenya
 Doug Larsen, ADF&G
 Vickie Le Cornu, SE AK Regional Subsistence Council
 National Marine Fisheries Service, Protected Resources Management Division
 National Marine Fisheries Service, Regional Administrator
 NOAA Ecology & Conservation Office
 Dewey Skan, SE AK Regional Subsistence Council
 Soil Conservation Serv., Environmental Coordinator, Ecological Science Div.
 Robert Sranco, Office of Equal Opportunity (OEO)
 William Thomas Sr., Chair, SE AK Regional Subsistence Council
 US Department of Commerce, NOAA Policy and Strategic Planning
 Lisa Weissler, Alaska Division of Environmental Coordination
 Pearl Young, U.S. EPA Office of Federal Activity

Media

Island News

Organizations and Businesses

Abacus Alaska, Inc.
 AK Wilderness Recreation & Tourism Association
 Ted Allio, Society of American Foresters
 Bryan Bird, Natural Resources Defense Council
 James Byron, Byron Brothers Cutting
 Clover Bay Fishing Lodge
 Dick Coose, C.A.R.E.
 Tim Droke, Seley Corporation
 Durrette Construction

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Larry Edwards, Greenpeace, Alaska Forests Campaign
Robert B. Elliot, Construction Machinery, Inc.
Page Else, Sitka Conservation Society
Prof. Paul Friesema, Institute For Policy Research
Sylvia Geraghty, Alaskans for Responsible Resource Management
Roger L. Gildersleeve, Gildersleeve Logging Inc.
Joe Beedle, President, Goldbelt Inc.
Bill Green, Seley Log & Lumber
Karen Hines, Sunny Cove Property Owners Association
Frank Bitonti, President, Hydaburg Advisory Committee
A.M. & Carol Johnson, Greater Alaska Cedar Works Inc.
Will Jones, Prince of Wales Lodge
John King, Tuxekan Logging
Katya Kirsch, SEACC
Louis A. Thompson, President, Kavalco, Inc.
Ritchie Campbell, CEO, Kootznoowoo, Inc.
Gerry Engel, Kootznoowoo, Inc.
Dennis Star, President, Kootznoowoo, Inc.
Cindy Lasiter, Sunny Cove Mariculture, Inc.
Nathaniel Lawrence, Natural Resources Defense Council
Jim Leslie, Leslie Cutting Inc.
Lester W. Looney, Prince of Wales Loggers League
Richard & Kay Andrew, Ketchikan Advisory Committee
Dr. Geoffrey McNaughton, Koncor Forest Products
Larry McQuarrie, Sportsman's Cove Lodge
Bill Menish, El Capitan Logging
Eric Muench, Alaska Woods Service Company
Scott Milner, Shuham & Milner, CPAs (PC)
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Leo Barlow, CEO, Sealaska Corp.
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 Ernesta Ballard & Wilbur Fisher
 Lonnie Bass
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 Mitch Bethel
 Sue Betzina
 Mrs. L.C. Bigelow
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 Len Brady
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 Wesley Buss
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 Larry Clark
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 Tom Craig
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 Derek Gronlund
 Bob & Carol Guest

4 Lists

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Terisa E. & Jard R. Hanscom
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N.K. Harrison
Ben, Judy & Lizzie Hastings
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Roy Hines
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Eric Hummel
Sharon Huxtable
Elzie Isley
Joseph C. Jensen
John Johnson
Theodore Johnson
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Jerry Kilanowski
Vivian Knapp
Timothy Knudson
Representative Al Kookesh
Mike Kouni
Matilda Kushnick
James B. Lehto
Joan & Ron Leighton
Steve Lewis
Stephen C. Lingenfelter
Daniel & Sharon Link
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Bob Long
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Forest A. Mackie
John McLane
Marvin McCloud
Pat Mc Donald
Steve Meredith
Sandra J. Meske
Denise Metcalf
Rena Miller
Kevin Moore
Ryan & Angela Morin
Gordon Nelson
Les Nelson
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Dave Owens
Dennis & Mary Owens
Linda Parker
Bruce Paulson
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Erin Preston

Ronald Preusser
 Tim Pruett
 Scott F. Purdy
 Joel Randup
 Troy Reinhart
 Arnold Reinhart
 Leslie Reno
 Doug Rhodes
 Gary L. Rice
 Greg Rice
 Mike & Cindy Rieves
 L. Scott Robinson
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 Mark Rorick
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 Jean Rovlet
 Mike Sallee
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 Dan Sharp
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 Cathy Starkweather
 Mr. & Mrs. John A. Storie
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 John White
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 Nathan J. Wilson
 Eric A. Woolery
 Werner Sund
 Lyle Yoder
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4 Lists

Public Officials, City Offices, IRA Tribes, and Native Organizations

Douglas Public Library
Elfin Cove Public Library
Haines Public Library
Hollis Public Library
Hyder Public Library
Kake Community Library
Kasaan Community Library
Ketchikan Public Library
Kettleson Memorial Library
Mendenhall Valley Public Library
Pelican Public Library
Petersburg Public Library
Skagway Public Library
Tenakee Springs Public Library
Thorne Bay Community Library
Wrangell Public Library
Frank Alby, Hydaburg Cooperative Association
Fred & Cheryl Athorp, Ketchikan Advisory Committee
Bartholomew, Mayor, Ketchikan Gateway Borough
Harlan Buoy, Klawock Advisory Committee
Viola Burgess, Hydaburg Cooperative Association
John Carle, President, Hydaburg Cooperative Association
Craig Public Library
Mac Demmert, Klawock Advisory Committee
Jim Dennis, Craig Advisory Committee
Glen Douglas, Hydaburg Advisory Committee
Ethel Edenshaw, Hydaburg Cooperative Association
Skip Fabry, Klawock Advisory Committee
Cheryl Fecko, Craig Advisory Committee & POW Cons. league
Dale Fife, City of Thorne Bay
Pat Gardener, Craig Advisory Committee
Haida Society
Gerald Helgesen, Hydaburg Advisory Committee
Mark Howey, Hollis Community Council
Mayor, City of Hydaburg
Chris Isakson, Craig Community Association Liaison
Duane James, Craig Advisory Committee
Charles Jones, Craig Advisory Committee
Juneau Public Library
Mayor, City of Kasaan
Executive Director, Ketchikan Indian Corporation
Manager, City of Ketchikan
Mayor, City of Ketchikan
Mayor, City of Klawock
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Adrian LeCornu, Hydaburg Advisory Committee
Paul Lingley, Shaan-Seet, Inc.
Ted Littlefield, Metlakatla Indian Community
Robert Major, Cape Fox Corporation
James Martinez, President, Klawock Tlingit & Haida
Mayor, City of Metlakatla
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Senator Frank Murkowski
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 Larry Painter, Ketchikan Advisory Committee
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 Robert Sanderson, Hydaburg Cooperative Association
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 Byron Skinna, Sr., Klawock Tribal Govt.
 Judy Slattery, Edna Bay Advisory Committee
 Ernest Smith Sr., Klawock Advisory Committee
 Millie Stevens, Craig Tlingit & Haida Comm. Council
 Senator Ted Stevens
 Senator Robin Taylor
 Edward Thomas, Central Council Tlingit and Haida
 Ginny Tierney, Administrator, City of Thorne Bay
 Dennis Watson, City of Craig
 Burlington Wellington, Metlakatla Tlingit & Haida Council
 Representative Bill Williams
 Joe Williams II, Organized Village of Saxman
 Ron Williams, ANB Grand Camp President
 Congressman Don Young

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Appendix A

Reasons for Scheduling the Environmental Analysis of the Cholmondeley Project Area

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Appendix A

Reasons for Scheduling the Environmental Analysis of the Cholmondeley Project Area

Introduction

This Appendix provides a detailed explanation of the rationale for a specific timber sale project and its importance to the multi-year timber program on the Tongass National Forest. To accomplish this, the following questions are answered:

- Why is timber from the Tongass National Forest being offered for sale?
- What steps must be completed to prepare a sale for offer?
- How does the Forest Service develop expectations about the market demand for timber?
- How does the Forest Service maintain an orderly and predictable timber sale program?
- How does the Forest Service decide where timber sale projects should be located?
- How does this project fit into the Tongass timber program?
- Why can't this project be located somewhere else?

Coordinated timber sale planning is essential for meeting the goals of the Tongass Land Management Plan and to provide an orderly flow of timber to local industry. To determine the volume of timber to offer each year, the Forest Service can look to current market conditions and the level of industry operations. However, the lengthy planning process, of which this document is a part, requires the Forest Service to rely on projections of future harvest levels to decide how many timber sale projects to begin each year. This document explains how the Forest Service uses information about future markets and past experience with the logistics of timber sale planning to determine the volume of timber that needs to be started through this process each year. Using a detailed timber sale schedule that provides information about each sale as it moves through each stage of the planning process, this Appendix explains the rationale and the necessity for completing this particular timber sale project at this point in time.

National Legislation

Why is Timber from the Tongass National Forest Being Offered for Sale?

On a national level, the legislative record is very clear about the role of the timber program in the multiple-use mandate of the National Forests. The Organic Act of 1897, 16 USC 473-481 (partially repealed in 1976) directed the agency to manage the forests in order to "improve and protect the forest ... [and] for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States" (emphasis added.) The Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. 528-531, directs the Forest Service to administer federal lands for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes."

The National Forest Management Act of 1976 (16 U.S.C. 472a) states that "the Secretary of Agriculture...[may sell, at not less than appraised value, trees, portions of trees, or forest products located on National Forest System Lands.]" Although the heart of the Act is land management planning, the Act also sets policy direction for timber management and public participation in Forest Service decision-making. Under NFMA, the Forest Service was directed to "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a sustained-yield basis" (16 U.S.C. 1611).

The NFMA directed the Forest Service to complete land management plans for all units of the National Forest System. Forest Plans were to be developed by an interdisciplinary team to provide for the coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. The 1979 *Tongass National Forest Land and Resource Management Plan* was the first Forest Plan to be completed. A revised Forest Plan was issued in 1997. With regard to timber production, the Record of Decision for the 1997 Plan stated:

The Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple use goals...Although the maximum amount of timber that could be harvested during the first decade of the Revised Plan implementation is an average of 267 MMBF per year, a level of 200 MMBF or less is more likely to be offered over the next few years, given current market conditions and the transition that both the timber industry and the Forest Service is experiencing. Therefore the public can expect the amount of timber to be offered annually to vary between 200 MMBF or less and 267 MMBF.

...The timber resource will be managed for production of sawtimber and other wood products from timberlands available for sustainable timber harvest, on an even-flow, sustained-yield basis and in an economically efficient manner. We will seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber and the market demand for the planning cycle...

In April 1999, Under Secretary Jim Lyons elected to modify the 1997 Plan and issue a new Record of Decision (ROD). As stated in the 1999 ROD:

The Tongass National Forest will continue timber harvest consistent with sustained yield and multiple use goals. The forest-wide standards and guidelines for timber include general direction to "[e]nsure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process. However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used..."

Forest-wide, considering all land allocations where timber harvest is permitted, it is estimated that 65 percent of harvesting will involve clearcutting, with the remaining 35 percent utilizing other methods.

...the ASQ for the next 10 years on the Tongass is reduced from an estimated average annual level of 267 MMBF in the 1997 ROD to 187 MMBF in the 1999 ROD, considering both NIC I and NIC II. Although initially this would seem to be a significant reduction in the ASQ, this ceiling for timber harvests from the Tongass remains sufficient to meet all but the most optimistic projections for timber demand and harvests from the Forest for the next decade. I believe that the additional environmental and multiple use benefits provided by this decision should not result in negative social and economic impacts based upon the most current demand for timber.

In the day to day operation of the Tongass timber program, the Forest Service attempts to strike a balance among timber availability as documented in the Forest Plan, the market demand for timber in Southeast Alaska, the needs and desires of other forest users, and funding allocations made by Congress.

Alaska-Specific Legislation

Legislation unique to Alaska also directs the Forest Service to maintain a commercial timber program. The Alaska National Interest Lands Conservation Act (ANILCA; P.L. 96-487, 1980) and the Tongass Timber Reform Act (TTRA; P.L. 101-625, 1990) speak directly to the issue of Tongass timber supply. Section 705(a) of ANILCA directed the Forest Service to maintain a timber supply from the Tongass at a rate of 4.5 billion board feet per decade. To ensure that the timber target was met, Congress provided for a \$40 million annual earmark to fund pre-roading, cultural treatments and innovated logging systems.

Section 101 of TTRA repealed the timber supply mandate and fixed appropriations of ANILCA and replaced them with the following more general direction:

Sec. 705. (a), Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act (P.L. 94-588); except as provided in subsection 9d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle.

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Timber from the Tongass National Forest is being offered as part of the multiple use mission of the Forest Service as identified in public laws. Alaska-specific legislation and the Forest Plan directs the Forest Service to seek to provide timber to meet market demand subject to appropriations and balancing of forest uses.

What Steps Must Be Completed to Prepare a Sale for Offer?

The timber sale program is complex. A number of projects are underway at any given point in time, each of which may be in a different stage of planning and preparation. A system of checkpoints, or "gates", helps the Forest Service track the significant milestones of each project from inception to contract termination. Each project passes through all of the following gates, with the complexity of the sale determining the complexity of the final product at each stage.

Gate 1 - Completion of Position Statement

The Position Statement is a brief analysis of the project area with the intent of determining the feasibility of the potential timber sale. This is the first step in the timber sale planning process and it is usually completed from seven to ten years before a sale is offered. After the Position Statement is developed, the Forest Service decides whether to continue to the next phase of the project where a significant investment in time and money will be made.

Gate 2 – Sale Area Design, Environmental Documentation, and Decision

This phase of the project is commonly referred to as the "NEPA" phase and includes inventory, public scoping, analysis, draft disclosure of the effects of the project on the environment, public comment, final analysis and disclosure, decision, potential appeal, and litigation. Gate 2 activities are generally completed two to six years before a sale is offered. The end product of this phase, an environmental decision document, forms the starting point for the next phase.

Gate 3 – Plan Implementation and Field Layout

Gate 3 activities are typically completed one to three years before a sale is offered. During this phase, the information and direction included in the decision document (Gate 2) is used to designate the actual project on the ground. Additional site-specific information is collected at this time.

Gate 4 – Appraisal Offering Package

The costs and value associated with the timber sale designed in Gate 3 are computed and packaged in a timber sale contract. The contract tells the prospective timber sale purchaser how the sale must be harvested to be in conformance to the project decision document. This phase of the Gate system occurs during the final year of the project development and culminates with the advertisement of the project for sale.

Gate 5 – Bid Opening

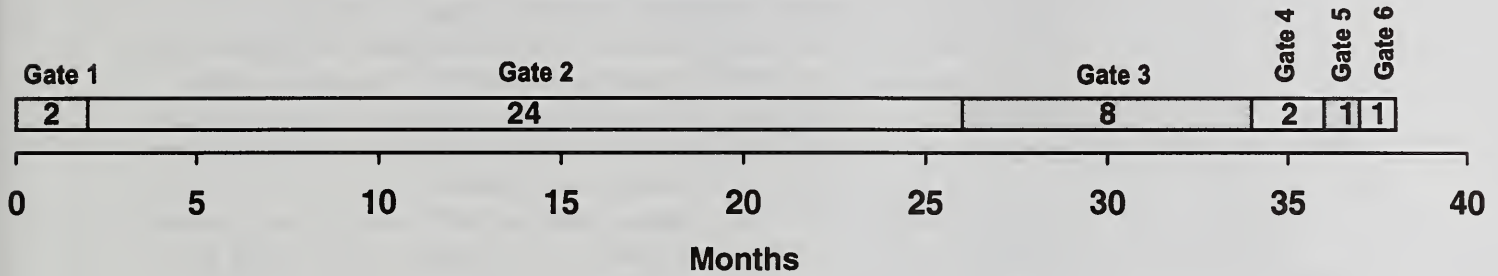
Gate 5 is completed with the opening of bids for the project. If a bid is submitted, contractual provisions govern when the award of the sale takes place and when the sale will be completed and how timber removal is to occur.

Gate 6 - Award

Gate 6 is the formal designation of a contract between a bidder and the Forest Service.

Figure A-1. Gate System Timeline

Average Timeline for the Gate System through Award



Gate 1 – Completion of Position Statement

Gate 2 – Sale Area Design, Environmental
Documentation and Decision

Gate 3 – Plan Implementation and Field Layout

Gate 4 – Appraisal Offering Package

Gate 5 – Bid Opening

Gate 6 – Award

How does the Forest Service Develop Expectations about Future Timber Markets?

The Tongass National Forest makes two determinations on volume to be offered. The first is a determination on volume to be offered for the current year (annual market demand). The annual market demand is analogous to assessing industry performance in the short-term. In the short-run a firm will make use of its existing equipment to maximize profits or minimize losses. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. Timber inventory requirements are acknowledged and estimated in a related calculation. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year. The document titled *Evaluating the Demand for Tongass Timber* (USDA, Forest Service, R-10; Morse; September 28, 1998) forms the basis for how these estimates were developed. The document titled *Tongass Timber Sale Procedures* (USDA, Forest Service, R-10; Morse, Draft August 30, 1999) documents actual estimates for the current year. This estimate is what the Tongass plans to offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so. Final procedures can be located in the document titled: *Responding to the Market Demand for Tongass Timber* (USDA, Forest Service, R-10-MB-413, Morse, April 2000).

Based on the analysis documented in the Draft *Tongass Timber Sale Procedures*, for Fiscal Year 2000, the Tongass National Forest plans to offer approximately 148 MMBF for sale. The sales planned for offer will be a combination of new, previously offered, or previously offered and reconfigured. Both standing timber and salvage will be components of the program. Offerings will consist of those targeted for Small Business qualified firms as well as a portion of the volume being made available for the open market.

Life of the Forest Plan (Market Demand over the Planning Cycle)

Given the long time involved in preparing a timber sale, the proposed timber sales in this document may not be harvested for 3 to 4 years or longer, not including appeals or litigation. The Forest Service needs some idea of what the long-term timber demand will be given cycles in the market. On average, what should the Forest Service plan for offer, given that timber from this NEPA document may not be harvested for 4 years into the future? The Forest Service needs to take a long-term view for planning purposes. To answer these questions, the Forest Service asked the Pacific Northwest Research Station for professional assistance.

As the Tongass Land Management Plan was being revised in 1997, research economists at the Pacific Northwest Research Station (PNW) were asked to update their earlier projections of Alaska timber products output and timber harvest by ownership. The most recent projections of timber harvest over the planning cycle account for several dramatic changes in the region's manufacturing capabilities, increased competition from a number of sources, and the steady erosion of North America's share of Japanese timber markets.

The Forest Service documents these projections and the means of implementation through the issuance of a Ten Year Timber Sale Schedule. Each year this plan is updated whereby the current year is dropped at the culmination of the fiscal year and a new year ten is added. The basis for this schedule is long-range timber market projections documented in the publication titled *Timber Products Output and Timber Harvest in Alaska: Projections for FY97-10* (Brooks and Haynes; PNW-GTR-409, September, 1997). These projections of Alaska timber products output, the derived demand for raw material, and timber harvest by owner are developed from a trend-based analysis. These projections reflect the consequences of recent changes in the Alaska forest sector and long-term trends in markets for Alaska products. With the closure of the two Southeast Alaska pulp mills, demand for Alaska National Forest timber now depends on markets for sawn wood and the ability to export manufacturing residues and lower grade logs. Three alternative projections are used to display a range of possible future demand (Table A-1). Areas of uncertainty include the prospect of continuing changes in markets and in conditions faced by competitors and the speed and magnitude in investment in manufacturing in Alaska.

Demand projections are important for program planning. They provide important guidance to the Forest Service for requesting budgets, for making decisions about workforce and facilities, and for indicating the need to begin new NEPA analysis for future program offerings. They also provide a basis for expectations regarding future harvest, and thus provide an important source of information for establishing the schedule of probable future sale offerings. The weight given to the projections will vary depending on a number of factors, such as how recently they were done, and how well they appear to have accounted for recent, site-specific events in the timber market.

Table A-1. Projected Tongass National Forest Harvest

Fiscal Year	Projected Harvest (MMBF)		
	Low	Medium	High
2000	95.5	116.6	142.7
2001	104.6	129.0	157.7
2002	113.7	134.9	173.1
2003	122.8	140.8	188.9
2004	131.9	146.5	205.0
2005	131.9	152.2	221.4
2006	131.9	157.8	238.2
2007	132.0	163.4	255.3
2008	132.0	168.9	272.8
2009	132.1	174.3	290.7
Average	122.8	148.4	214.6
Mean	168.7		

For Fiscal Years 2001-2009, the Tongass National Forest plans to schedule approximately 160 MMBF for sale each year over the life of the Forest Plan. This schedule is based on the projections documented in *Timber Products*

Output and Timber Harvest in Alaska: Projections for FY97-10 (Brooks and Haynes; PNW-GTR-409, September, 1997), and current volumes in the timber sale pipeline process. Prior to the beginning of Fiscal Year 2001 the amount of volume scheduled in outyears will once again be analyzed to determine if projections made now meet the anticipated needs in the future.

How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?

Pools of Timber (Pipeline Volume)

As discussed earlier, the Forest Service tracks accomplishment of various stages of development of each timber sale with the Gate System process. From a timber sale program standpoint, it is also necessary to track and manage multiple projects through time as projects collectively move through the Gate System. Tracking of the multiple projects can be likened to following various segments of several projects through a pipeline of time. Because of the relatively long timeframes needed to accomplish a given timber sale and the complexities inherent in timber sale project and program development, it is necessary to track various timber sale program volumes from Gate 1 through Gate 6. Gate 1 volume represents a large pool of program volume, but represents a relatively low investment from project to project. This relative investment level offers the timber program manager a higher degree of flexibility and thus, does not greatly influence the flow of volume through the pipeline. In addition, tracking of how much volume near the end of the pipeline that is in appeals or litigation may be necessary to determine potential effects on the flow of potential timber sales.

The goal of the Tongass National Forest is to provide an even flow of timber sale offerings on a sustained yield basis. In past years, this has been difficult to accomplish due to continual reductions in the suitable timber land base, reductions in the timber industry processing capabilities, rapid market fluctuations and Forest Plan modifications and litigation. To achieve an even flow of timber sale offerings, 'pools' of projects in various stages of the Gate System will be maintained so volume offered can be balanced against current year demand and market cycle projections. Today, upward trends in demand are reacted to by moving outyear timber projects forward leaving outyears not capable of meeting the needs of the industry. In other instances, a number of new projects are started based on today's market but not available for a number of years. By the time the added projects are ready for offer, the market and demand for this volume has changed. Three pools are being tracked to achieve an even flow of timber sale offerings:

- **Timber volume under analysis (Gate 2):** Timber volume under analysis contains sales being analyzed and undergoing public comment through the NEPA process. This process can often take from one to five years and reaches a significant milestone when a NEPA decision is made. This pool includes any project with a formal Notice of Intent through those with a decision document issued. Volume in appeals and litigation will be tracked as a subset of this pool as necessary.

- **Timber volume available for sale (Gate 3, Gate 4 and Gate 5):** Timber volume available for sale contains sales for which environmental analysis has been completed, and administrative appeals, and litigation (if any) have been resolved. They have also been fully prepared, and are available to managers to schedule for sale offerings. Managers need to maintain enough volume in this pool to be able to schedule future sale offerings in an orderly manner of the size and configuration that best meets the need of the public. As a matter of policy, and sound business practice, the Forest Service attempts to announce probable future sale offerings at least one year in advance. This allows potential purchasers an opportunity to do their own evaluations of these offerings in order to determine whether to bid, and if so, at what level.
- **Timber volume under contract (Gate 6):** Timber volume under contract contains sales that have been sold and a contract awarded to a purchaser, but has not yet been fully harvested. Timber contracts typically, but not always, give the purchaser three years to harvest and remove the timber purchased. Long standing Forest Service practice is to attempt to maintain about two to three years of unharvested timber volume under contract to timber purchasers. This volume of timber is the industry's dependable timber supply, which allows immediate flexibility in business decisions. This practice is not limited to the Alaska Region, but is particularly pertinent to Alaska because of the nature of the land base. The relative absence of roads, the island geography, the steep terrain, and the consequent isolation of much of the timber land means that timber purchasers need longer-than-average lead times to plan operations, stage equipment, set up camps, and construct roads prior to beginning harvest.

What drives the various timber sale program pipeline pool volume is a combination of actual harvest and projected demand. As purchasers harvest timber, they deplete the volume under contract. Managers track harvest, and offer sales that give the industry as a whole the opportunity to replace this volume and build or maintain their working inventory. Although there can be significant variation for practical reasons from year to year, in the long-run, over both the high points and low points of the market cycle, timber harvest will equal timber sales.

The Forest Service, based on historical patterns, determines the amount of pipeline volume in each of the pools. Table A-2 displays what volume levels are expected to be maintained in each pool.

- Pool 1, Timber Volume Under Analysis, is expected to be maintained at approximately 4.5 times the amount of anticipated harvest.
- Pool 2, Timber Volume Available for Sale, is expected to be maintained at approximately 1.3 times the amount of anticipated harvest.
- Pool 3, Volume Under Contract, is expected to be maintained at approximately 3 times the amount of anticipated harvest.

The objective of the pools concept is to maintain sufficient volume in preparation and under contract to be able to respond to yearly fluctuations in a timely manner.

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Table A-2. Pipeline Pool Matrix

Pipeline Pool Volume	Flows	Start of Year One	During Year One	End of Year One
1. Volume Under Analysis (Gate 2) ¹ (MMBF)		238	401	230
	NEPA Decision	126	343	171
2. Volume Available for Sale (Gate 3, Gate 4 and Gate 5) ² (MMBF)		79	266	159
	Offered		163	
	Sold		148	
3. Volume Under Contract (Gate 6) ³ (MMBF)		325		352
	Volume Harvested*		121	

Matrix crosswalk between Gate Tracking System and Pools of Timber Concept:

¹Gate 2: Proposed timber volume with a published decision document (Record of Decision) that is viable for sale after completion of appeals and litigation.

²Gate 3: NEPA cleared timber volume with field preparation work completed and the timber sale ready to be offered in a timber sale contract package.

³Gate 6: Timber volume under contract.

*Note-The amount of volume estimated to be harvested for the year sets the basis for what will be maintained in Pools 1-3 (**Gates 2 through 6**). Should this estimate be incorrect, adjustments can be made in the following years without significant departures in outyear programs capabilities.

Table A-3. Timber Volume in Appeals and/or Litigation

Timber volume in appeals and/or enjoined in litigation *	23.8 Million Board Feet
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*As of 03/31/00. The volume in appeals and or enjoined in litigation is updated on a quarterly basis.

How Does the Forest Service Decide Where Timber Sale Projects Should be Located?

The Allowable Sale Quantity (ASQ)

The Modified 1997 Forest Plan Record of Decision (ROD) established an ASQ for timber at 1.87 billion board feet per decade, which equates to an annual average of 187 million board feet (MMBF). The ASQ serves as an upper limit on the amount of timber that may be offered for sale as part of the regularly scheduled timber sale program. It consists of two separate Non-Interchangeable Components (NICs) called NIC I, which is 1.53 billion board feet of timber per decade, and NIC II, which is .34 billion board feet per decade. There are two purposes of partitioning the ASQ into two components:

- 1) to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground and
- 2) to identify that portion of the timber supply that is at risk of attainment because of marginal economic conditions.

The NIC I component includes lands that can be harvested with normal logging systems. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. Most of these NIC II lands are presently considered economically and technically marginal.

Immediately following the issuance of the Modified 1997 Forest Plan Record of Decision by the Deputy Under Secretary of Agriculture, James Lyons, the Forest Service began an analysis of the ROD to develop consistent methodologies for its implementation (*Implementation of Tongass Land Management Plan*, James A. Bartelme, Acting Forest Supervisor, May 11, 1999). The purpose of the analysis was to develop methodology to ensure the modified Forest Plan changes received a consistent implementation approach across the Tongass, and to determine where the land base existed to begin programming current and future timber sale projects.

The Tongass National Forest has been unified under one Forest Supervisor. For planning and scheduling purposes, the allowable sale quantity is distributed by Ranger District. Each District has been allocated a portion of the timber harvest program based on the FORPLAN computer run and availability of suitable and available acres, to implement the Forest Plan, and Section 101 of the Tongass Timber Reform Act (1990). The Forest Plan set the Forest-wide allowable sale quantity (ASQ) upper limit at 187 MMBF per year. The distribution of the planned ASQ harvest among the Districts is listed in Table A-4 (all volumes are identified as sawlog plus utility).

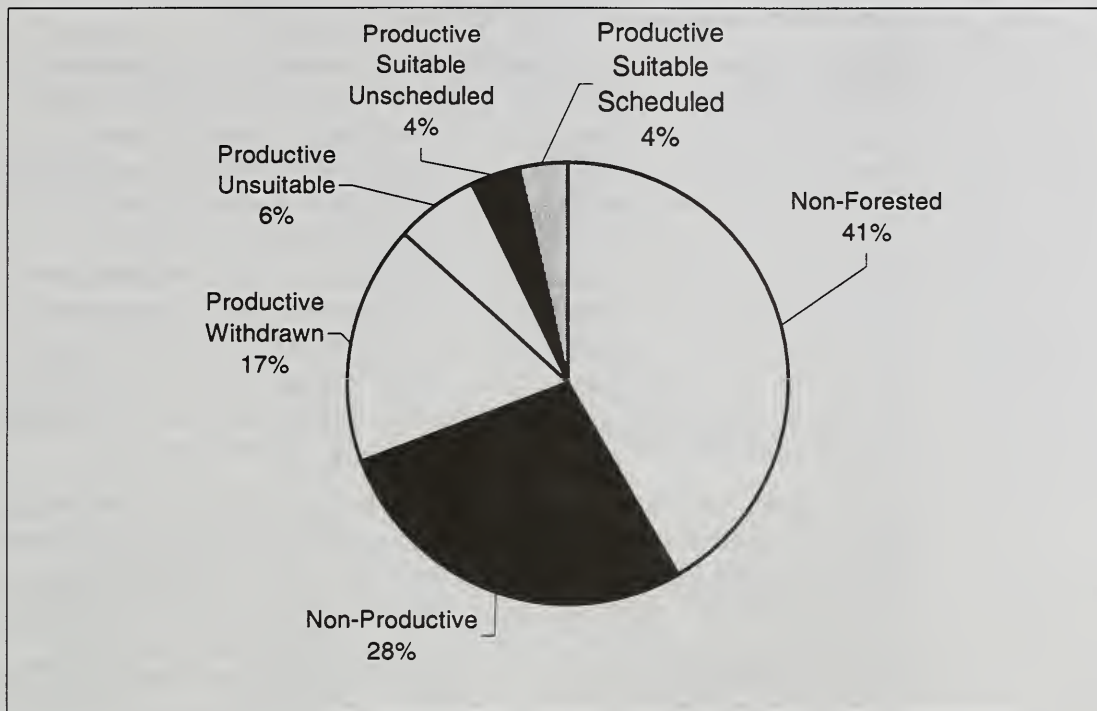
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Table A-4. Distribution of ASQ Among the Tongass National Forest Ranger Districts

Tongass NF Ranger District	Non-Interchangeable Components (mmbf)	
	NIC I	NIC II
Ketchikan	18	4
Thorne Bay	21	5
Craig	18	4
Wrangell	24	4
Petersburg	37	8
Sitka	12	3
Hoonah	6	2
Juneau	12	3
Yakutat	5	1
Admiralty	0	0
NIC Totals	153	34
ASQ Total (mmbf)	187	

Historically, timber harvest activities were generally concentrated in the central and southern portions of the Tongass. Now, under the Modified 1997 Forest Plan, the suitable timberland base is more evenly distributed across the Forest. As a result, it is necessary to lessen harvest on the southern end and begin planning projects in areas further north. In answer to the question presented for this section of the Appendix, the suitable timber base is capable of producing the ASQ documented in the Modified 1997 Forest Plan Record of Decision. However, harvest activities will be more evenly distributed than they were in the past.

Figure A-2. 1997 Modified Forest Plan Land Allocations



This chart depicts the productive suitable land base that is scheduled for timber harvest activities. Four percent of the Tongass land base generates the allowable sale quantity of 187 MMBF per year. The remainder of the land, approximately ninety-six percent, does not allow or will not support timber harvest activities.

District-Level Planning

The Forest Supervisor for the Tongass National Forest has discrete responsibilities for the overall management of the Forest's timber sale program. Included within these responsibilities is making the determination on the amount of timber volume to be made available to industry, as described above. Once a determination is made for the current year (annual demand) offer level, the information is presented to Congress via the Regional Forester and Chief of the Forest Service. Whether or not funding is appropriated to attain the program is the responsibility of the Congress and the President of the United States.

While the debate on funding takes place, the Tongass Forest Supervisor directs the District Rangers to formulate timber sale schedules that attain the prescribed offer level for the current year as well as develop outyear timber programs based on projected market demand for the planning cycle. It is the Ranger's role to recommend to the Forest Supervisor timber sale projects that meet Forest Plan goals and objectives. Districts work on various projects simultaneously resulting in continual movement of projects through the stages of the timber program pipeline. Their schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit

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acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. Once all of the Rangers' recommendations are made and compiled into a consolidated schedule, the Forest Supervisor is responsible for the review and approval of the final plan.

Pending Congressional appropriations, the sale schedule is implemented. In the event insufficient funds are appropriated to achieve the desired outputs, timber sale projects are selected and implemented on a priority basis. Generally, the higher priority projects include sales where investments such as road networks, camps or log transfer facilities have already been established. Those sales that are not implemented or only partially implemented are moved to the outyears. The sale schedule becomes very dynamic in nature due to the number of influences on each of the districts. A formal review of the schedule is done annually by the Forest Supervisor in consultation with the District Rangers, and amendments are made as needed through the course of the year. (The Tongass Timber Sale Plan is located on the Tongass National Forest Website, www.fs.fed.us/r10/Tongass/)

The National Forest Management Act requires the Forest Service to develop timber sale schedules that encompass the life of the Forest Plan. The recent Tongass National Forest planning process culminated in issuance of the *Modified 1997 Forest Plan Record of Decision for the Tongass Land and Resource Management Plan*. In response to this Plan, the Tongass has prepared a Ten Year Timber Sale Schedule for Fiscal Years 2000-2009. The Fiscal Year 2000 offer level is based on annual market demand estimates. The remaining years, 2001-2009, are based on market demand projections over the planning cycle. Table A-5 denotes the first year of the ten-year plan. Fiscal Year 2000 is listed below to show the reader an example of the information available and display the timber sales scheduled for the current fiscal year.

Table A-5: Tongass Ten Year Timber Sale Schedule – Fiscal Year 2000

NEPA Project	Decision Date	RD	S+U (MMBF)	Sale Name	Vol S+U (MMBF)	Class	FY00		
							Gate 2	Gate 3	Gate 5
Sea Level EIS	May-99	KRD		Madder	26	S			26
Sea Level EIS	May-99	KRD		Buckdance	11	S			11
Sea Level EIS	May-99	KRD		Orion	13	S			13
Craig Small Sales EA	x	CRD	1.5	Craig Small Sales	1.5	S	1.5	1.5	1.5
TNB Small Sales EA	x	TNB	5	Various	5	S	5	5	5
Luck Lake EIS	Jan-00	TNB	13	Luck Lake	5	S	13	5	5
Luck Lake EIS	Jan-00	TNB		Twin Bridge	8	S		8	8
Couverden CE	Jun-00	JRD	0.8	Couverden Salvage	0.8	S	0.8	0.8	0.8
8-FATHOM EIS	Apr-96	HRD		Midway	6.4	S		6.4	6.4
HRD Small Sales EA	x	HRD	0.2	Small sales	0.2	S	0.2	0.2	0.2
NW BARANOF EIS	Feb-96	SRD		Schultz	8	S		1	8
Small Salvage Sale CE	x	YRD	0.2	Small Salvage Sale-00	0.2	S	0.2	0.2	0.2
Woodpecker EIS	(May-00)	PRD	(5-18)	Woodwork	1	S	18	1	1
Twin Creek EA	Aug-98	PRD		Twin Creek heli (41,66)	1.5	S		1.5	1.5
Twin Creek EA	Aug-98	PRD		Twin Creek 15	0.1	S		0.1	0.1
South Lindenberg EIS	Dec-96	PRD		South Central (U140)	1.5	S		1.5	1.5
South Lindenberg EIS	Dec-96	PRD		S.Lindy SE	10	S		10	10
East Fork EA	Jul-88	PRD		East Fork	2	S		2	2
Bohemia Mountain EIS	Jun-95	PRD		Goose (Unit 538)	1	S		1	1
Doughnut EA	x	WRD	8	Doughnut	4	O	8	4	4
Skipping Cow EIS (X)	x	WRD	20	Skipping Cow	20	S	20	20	20
Kuakan EIS	x	WRD	12	Kuakan	12	S	12	12	12
Total			40		138.2		40	81.2	138.2

NOTE: The difference between projected volume (148 MMBF) and offer volume (138 MMBF) will be made up from re-offer/reconfigured unsold FY 98/99 timber sales.

The Ten Year Schedule provides a significant amount of information and is described as follows:

NEPA Project: Environmental document project name. This name may or may not differ from the timber sale project name depending on how many sales originate from the original NEPA document.

Decision Date: The date of the decision document, whether planned or actual. "x" denotes project has started and completion is within the Fiscal Year but a specific date (e.g. month) is not firm.

RD: Ranger district office where project is located (PRD=Petersburg Ranger District).

A Appendix

S+U (MMBF): Anticipated timber volume (sawlog plus utility) expected from the NEPA document. Generally only appears once in the year the decision is made. If no volume is shown, decision on document was made in another fiscal year.

Sale Name: Timber sale project name.

Vol S+U (MMBF): Timber sale project volume (sawlog plus utility).

Class: Timber sale size class determination (S-SBA, O=open sale to all bidders).

FY00 Gate 2 (NEPA): Only appears in the year the NEPA document will be decided. Number designates potential volume.

FY00 Gate 3 (Layout): Only appears in fiscal year sale is to be laid out and appraised. May appear in more than one year.

FY00 Gate 5 (Offer): Only appears in fiscal year sale is to be offered. Number designates potential volume.

The location of timber sale projects are based on the land allocation directed in the Forest Plan decision. Timber sales are located where permitted based on the prescription and objectives of the land use designation. Timber sale projects are located to varying degrees in land use designations identified as Timber Production, Modified Landscape, and Scenic Viewshed.

As stated earlier, the District Ranger is responsible for identifying and recommending the project areas for the Ten Year Timber Sale Schedule. The considerations the Ranger makes on each project includes but are not limited to the following:

- The project area contains a sufficient number of acres allocated to development land use designations to make timber harvest in the area appropriate under the Forest Plan. There is an adequate amount of suitable and available land for timber harvest opportunities. Available information indicates harvest of the amount of timber volume being considered for this project can occur consistent with the Forest Plan standards and guidelines and other resource protection requirements.
- The project and proposed timber harvest volume can contribute to achieving the goals and objectives of implementing the Forest Plan.
- The potential investment in infrastructure (roads, bridges, log transfer facilities, camps, rock pits, etc.) is necessary for sustainable timber harvest offerings. Where infrastructure already exists, this project will enable maintenance and upgrade of the facilities, which is necessary for removal of timber volume.
- The potential effects on subsistence and other resources.
- Based on current year and anticipated outyear timber volume demand; volume currently under contract; anticipated Congressional allocations; and the availability of resources to fully prepare and offer this project for sale, this project is consistent with and meets all laws and regulations. These laws and regulations include Forest Service Policy in the Alaska Region Regional Guide; Best Management Practices; the Modified 1997 *Tongass Land and Resource Management Plan*; and all other laws and

regulations governing the removal of timber from National Forest System Lands.

How Does This Project Fit into the Tongass Timber Program?

The Cholmondeley Project is proposed for offer beginning in Fiscal Year 2001 (Tongass National Forest Ten Year Timber Sale Schedule, approved by Thomas Puchlerz, Forest Supervisor, 10/20/99). Forest-wide, total offer volume being planned for Fiscal Year 2001 is approximately 194 MMBF. In order to achieve the planned offer date, the Cholmondeley Project has a proposed Gate 2 completion date of June 2001 with Gate 3 implementation to begin by Fiscal Year 2001.

The Cholmondeley Project is currently in Gate 2, "Volume Under Analysis." The project's action alternatives being addressed in the NEPA analysis range from 10.9 MMBF to 20.1 MMBF that could contribute to the Tongass Timber Sale Program. As described earlier, the volume of timber needed to maintain this pool is 392 MMBF. Currently, forest-wide, Pool 1 contains from 158.4 MMBF to 170.2 MMBF inclusive of this project. Therefore, the Cholmondeley Project is consistent with program planning objectives and necessary to meet the goal of providing an orderly flow of timber from the Tongass on a sustained yield basis. Given the included information, it is reasonable to be conducting the environmental analysis for this project at this time.

Why Can't This Project Occur Somewhere Else?

As previously discussed, the market demand for timber for the next ten years is expected to average 160 MMBF per year. The suitable and available land base on the Tongass is capable of supporting an Allowable Sale Quantity of 187 MMBF annually, 153 MMBF of which is considered economical (i.e. the NIC I component). Based on the projected market demand for the planning cycle, all suitable timberlands will eventually be scheduled for harvest to meet the current and projected demand for raw material in Southeast Alaska. The relocation of this project in another area is inefficient and potentially contrary to the standards and guidelines of the Forest Plan. This decision is based on the cumulative impact on other resources from past harvest activities, the location of timber sales under contract, and the eventual use of all suitable lands for timber sale projects.

Areas with available timber will be necessary to consider for harvest in order to seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).

The potential effects on subsistence resources are projected to differ little based on the sequence these areas are harvested. Harvesting other areas with available timber on the Tongass National Forest is expected to have similar potential effects on resources, including those used for subsistence, because of widespread distribution of subsistence use and other factors. Harvest within other areas is foreseeable, in any case over the forest-planning horizon under the Forest Plan.

Providing substantially less timber volume than required to meet Forest Plan and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the project area is not necessary or reasonable.

It is reasonable to schedule harvest in the project area rather than in other areas at the present time based on previous harvest entry and access, level of controversy over subsistence and other effects, the ability to complete the National Environmental Policy Act (NEPA) process and make timber available to meet the needs of dependent industries. Other areas that are reasonable to consider for harvest in the near future are the subjects of other project EIS's that are currently ongoing or scheduled to begin soon.

Appendix B

Unit Cards

Abstract

1. Introduction

The purpose of this study is to investigate the effects of the proposed system on the performance of the system. The study is divided into two main parts: a theoretical analysis and an experimental evaluation. The theoretical analysis is based on the principles of the system and the experimental evaluation is based on the results of the experiments.

Cholmondeley Timber Sales

Unit Cards

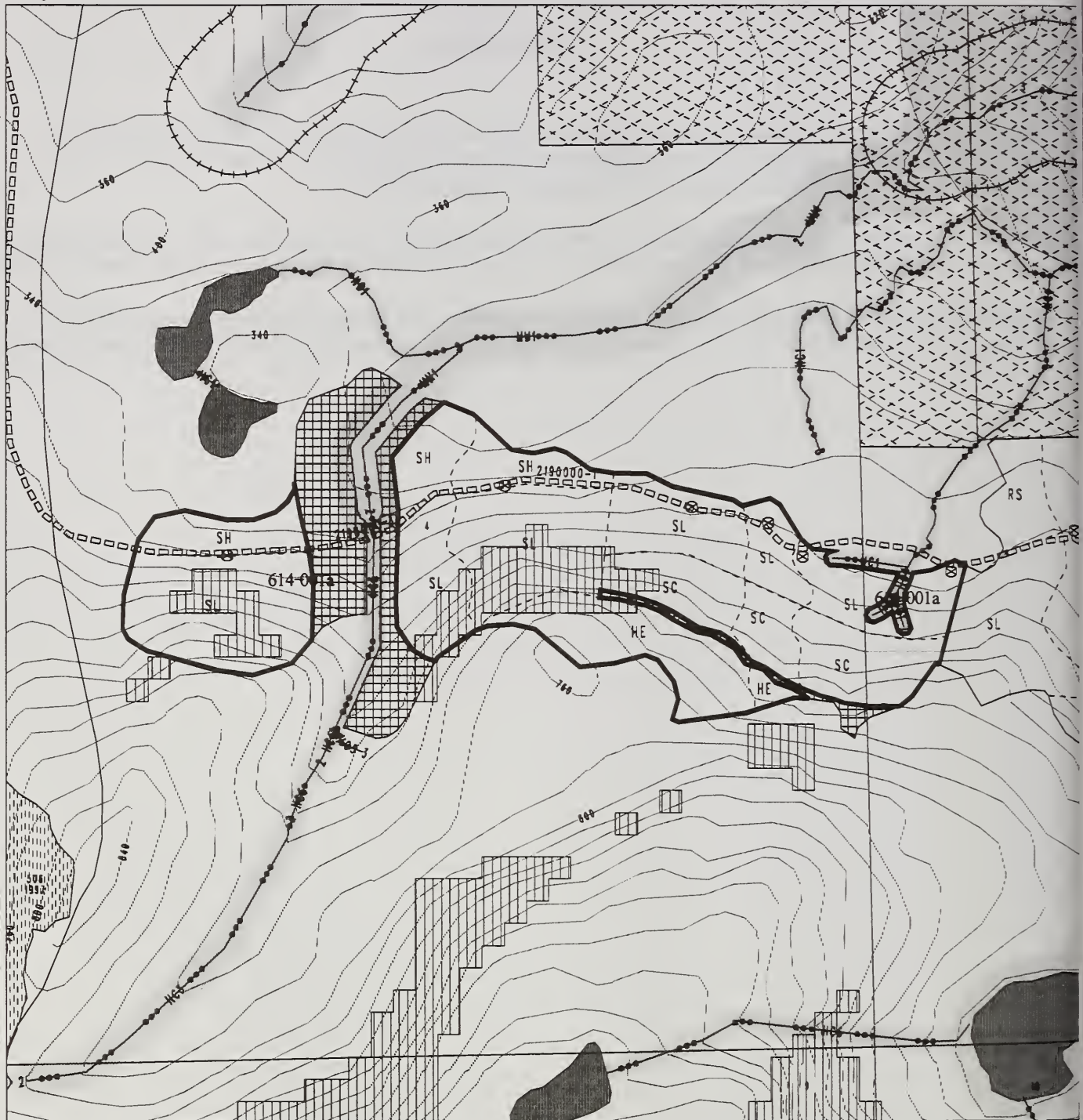
The unit cards provide a summary of the information about the individual proposed harvest units which are included in one or more alternatives. They portray the site-specific information such as additional mitigation, observations, and where further assistance will be needed during field layout.

The unit cards reflect the desirable condition of the final unit as developed through the interdisciplinary process. They also provide the reviewer with an opportunity to compare the units as they appear in the different alternatives.

Unit cards are used in concert with the silvicultural prescription to aid the field implementation personnel in obtaining the desired objectives as developed by the interdisciplinary team and selected in the Record of Decision.



Cholmondeley DEIS Unit 614-001a



- Saltwater
- RWA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-001A ACRES: 53 VOL: SEE -001B MBF ALTERNATIVES: 2-5

PHOTO YR/ #: '91/590-77,78 1/4 QUAD: ELEV. RANGE: 200-600 ASPECT: N LOGGING SYSTEMS: SL, SH, HE

WATERSHED#: CU5A NAME/CAT#: Sportman's Cove/102-60-08 ROAD#: 2190000-1 WINDTHROW RISK: L-M
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F6, F11, F15, F18, F20, F21, T4, W1, W5, W7, W28, V1, V4, V5, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G.Lawton 9/98	SILVICULTURE/TIMBER Exam stds 31,29,16,18F; super std net vol/ac <u>31M</u> ; low mistletoe; 80% downhill yarding; windthrow risk: low; logging systems options: cable, shovel, helicopter; regeneration system options: CC, GS; site productivity: moderate, 39 acres of HI volume strata-adjusted to 35 acres due to lower volumes areas; shovel yarding is OK according to plant association.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED About 30 percent of the unit is cedar-hemlock-blueberry-skunk cabbage forested wetland. Slopes range from 30 to 80 percent gradient with approximately 8 acres of slopes over 72 percent. Landslide potential is moderate and high in the unit. Use partial suspension to mitigate landsliding and minimize impacts to forested wetlands (BMPs 12.5, 13.5 & 13.9). Two small cliffs are located in the unit. Use reserve clump placement and helicopter yarding around the cliffs to keep soil displacement within soil quality standards. (BMP 13.2 and 13.9). The western boundary streams are used by local residents for domestic water supplies. The riparian areas on these streams are defined by the slope-break on V-notch reaches (BMP 12.6). The buffer will include the entire riparian area and should include a reassurance of windfirmness zone (Approximately 250 feet wide on the west side of the stream and 100 feet wide on the east side of the stream.) (BMP 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMP 13.16). Residents of Saltery Cove will monitor water quality in domestic water supply streams and notify the Forest Service if water quality deteriorates. The Forest Service will then take action to insure unacceptable conditions are fixed.
P.Moore T.Paul 6/25/97 S.Levesque 1999	FISHERIES (Units A & B) Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1/5</u> Slopebreak buffer plus 25' for windfirmness. Stream# <u>2</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>MM1/HC5</u> Buffer the stream approximately 250 feet on the west side and 100 feet past the slopebreak on the east side. The MM1 portion on the east side requires a 120' buffer (MM1 is where average gradient is <6%). This stream is a permitted <u>domestic water supply</u> stream for Saltery Cove residents. Stream# <u>3</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> Fall and yard away where practical and leave non-merchantable trees along the stream. This stream has been deleted from the unit. Stream# <u>4</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Streams 2, 4, 5, 6 & 7 are used as a domestic water sources. Slope break buffer plus additional windfirm zone as needed to maintain integrity of riparian management area (mostly outside of unit). Stream# <u>5</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1</u> Tributary to Stream #4. Although stream does not meet bankful width and incision criteria for Class III, additional protection is warranted to maintain downstream water quality. Stream parallels current road location at base of unit. Alternate road locations should be explored to minimize connectivity of road and stream networks. Streams# <u>6 and 7</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1</u> These small streams form the headwaters for Stream #4. Although streams do not meet bankful width and incision criteria for Class III, additional protection is warranted to maintain downstream water quality for <u>domestic water source</u> . Small catchment in the northeast corner of the unit encompassing Streams 6 and 7 should be buffered with consideration of windfirmness (approximately 2 acres). BMP 12.6, 13.16
L. Mosenthin A.Moore 6/24/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Majority of unit a western hemlock/western red cedar/blueberry/salal plant association. Utilize cliffs below helicopter setting as retention area for wildlife. Structure retention for high value martin habitat acres, 3.1-6.2 acres, need to be in the western half of the unit below the cliffs. Unit will contain corridors of cut and uncut timber extending from the 100 foot no cut area below the cliffs down to 510 feet in elevation. The corridor acres are in habitat that should not counted towards the acreage retained for marten. <i>Scirpus subterminalis</i> was found near the small lake just north of the east end of this unit. This plant is ranked by the Natural Heritage Program as S1-critically imperiled in the state, because of extreme rarity or some factor(s) making it especially vulnerable to extirpation from the state. This one sighting may be the first documented occurrence on Prince of Wales Island. See Botany report and the road cards for more information on this plant.
T. Fifield 03/13/00 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: The adopted VQO for this viewshed is maximum modification. Unit as originally conceived will meet this objective. However recommend that we try to attain a higher objective in at least one alternative. This should involve breaking up the long clearcut swath and long backline edge created by 614-001a and 001b by retaining a significant amount of forest texture in the upper more visible slopes of the eastern portion of 614-001a, and in the upper SW corner of 614-001b. This will result in meeting a partial retention objective. RECREATION: Unit is located above the community in Saltery Cove. Re-design of the unit to diminish dominance of the back line (as indicated in the Visuals section) would reduce impacts to the recreation setting in Saltery Cove.

G.Lawton
3/00

PRESCRIPTION: One entry proposal. Reserves for visual, marten, and drinking water mitigation. Alt. # 2,4,5 Combination of even-aged clear-cut with reserves (type c) on the top steep areas, an even-aged clear-cut w/reserves (type A) thru most of unit, and a slackline portion on the eastern 1/3 of alternating cut and leave strips; retain <15% of cutting unit overall, or <30CCF where feasible and safe.

TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to the western 1/2 of the unit. They require 3.1-6.2 acres of structural retention for high value marten habitat credited in: 14 acres in stream #2 class III buffer, slope-break buffer and additional RAW buffer. Stream buffer consists of below road: 120' east side, 250' west side; above road 250' west side and 100' east side and further up slope beyond slope break. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to 152 live trees >20"dbh and 114 snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave.

To achieve partial retention VQO in the upper eastern portion of the unit, place a no-cut zone along cliff-line and ~100' below with a partial cut area down to ~520' elevation. The partial cut area consists of alternating corridors (SC=slackline corridors) of cut and leave (200' wide ~two tree lengths).

Soils partial suspension requirements and about 4/5 of the unit requiring downhill yarding will force the use of slackline cable logging on most of unit. Possibly use w/shovel at the lower/flatter portions. Slackline logging system is anticipated on steep western parts below helicopter portions.

Helicopter log the upper portions above the cliffs leaving unmerchantable stems for less visual impact.

Est. vol. [(36 Ac x 30)+(9 ac x 15)+(9ac x 25)] = 1400mbf. Future activities: regeneration survey, precommercial thinning at 15 to 25 years.

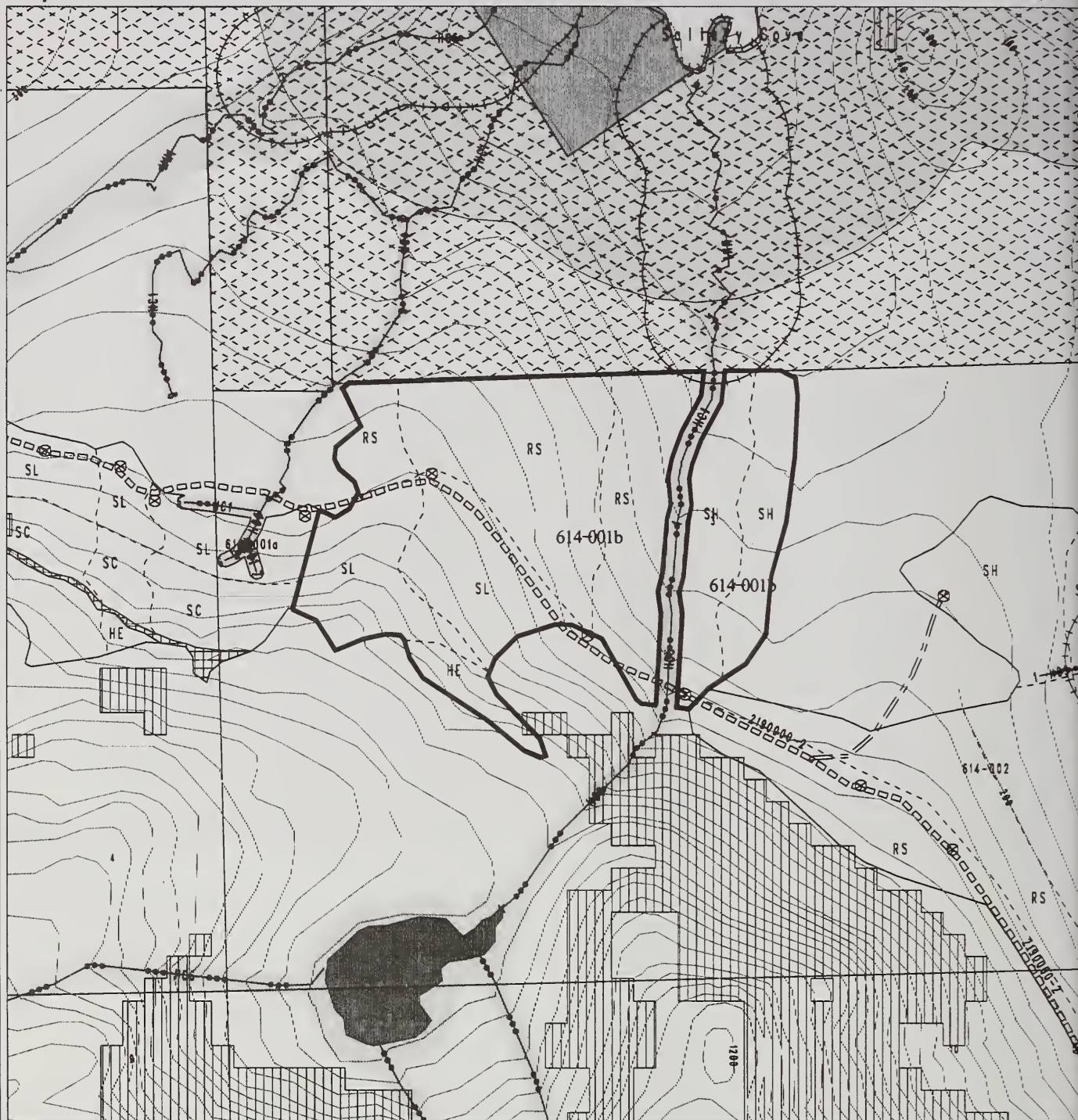
PROTECT POTENTIAL DOMESTIC WATER STREAMS #2, 4, 5, 6, 7. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevention of oil spills, and potential written agreements. Avoid building additional spur road above streams 5, 6, & 7.

Streams 4-7 will have buffers tallying ~2 acres which can also be credited as marten habitat and realignment of the system road should be considered to prevent sedimentation in stream 4. Partial suspension required on the entire settings encompassing and above streams 5, 6, and 7.

Alt. 3 proposal : cutting pattern varies to better address community issues of water quality, visuals and serenity. Western stream: same no-cut buffers. However, add variable buffer for ~250' east and west side of stream for treatment of 50% BA removal. Data suggests removal of everything > or = 23"dbh. (20mbf/ac x 7 ac = 140mbf). Area west of additional stream buffer(#2): 90% BA removal (28mbf/ac x 5 ac = 140mbf). Area above cliffs: 50% removal, cut > and = 23"dbh (15mbf/ac x 7ac = 105mbf). Eastern stream(#4,5,6,&7): same no-cut buffer of ~250' each side of stream, add additional ~250' buffer of 50% BA removal, > or = 23" dbh (20mbf/ac x 7 ac = 140mbf). Area between stream buffers: (center of unit) 75% BA removal, > or = 18"dbh, (20mbf/ac x 19ac = 418mbf). The varying BA removals could be called Two-aged clearcut with reserves. Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two structured stand. 1) Retention to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) Distribution. Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) Size of opening. The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



Cholmondeley DEIS Unit 614-001b



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- Slope & Private Land

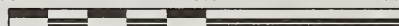
- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Cord)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Lagging Setting Boundary (See Unit Cord for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Lag Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-001B ACRES: A&B 106 VOL: Alt 5=3070MBF, Alt 3=2640 MBF ALTERNATIVES: 2-5

PHOTO YR/#: '91/590-77,78 1/4 QUAD: ELEV. RANGE: 200-600 ASPECT: N LOGGING SYSTEMS: SL,SH,HE,RS

WATERSHED#: CU5A NAME/CAT#: Sportman's Cove/102-60-08 ROAD#: 2190000-2 WINDTHROW RISK: LOW
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F6, F11, F18, F21, T4, W1, W7, W28, V1, V4, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G.Lawton 9/98	SILVICULTURE/TIMBER Exam 31,29,16,18F; super std net vol. ac 31M; low mistletoe; 80% downhill yarding; windthrow risk low; logging systems options: cable, shovel, helicopter; regeneration system options: cc.gs; site productivity moderate; 39 acres of H1 volume strata-adjusted to 35 acres due to lower volumes areas; shovel yarding according to plant association
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 70 percent gradient in the unit. About 25 percent of the unit is forested wetlands. Landslide potential is moderate in the unit. Use partial suspension to minimize impacts to soil and wetland resources (BMPs 12.5 & 13.9). The stream in the east end of the unit has an identifiable riparian area below the slope-break (BMP 12.6). The stream buffer should include the entire riparian area and a reasonable assurance of windfirmness zone (BMP 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMP 13.16). An estuary buffer may apply to the northeast boundary of the unit. Residents of Sallery Cove will monitor water quality in domestic water supply streams and notify the Forest Service if water quality deteriorates. The Forest Service will then take action to insure unacceptable conditions are fixed.
P.Moore T.Paul 6/25/97	FISHERIES (Units A & B) Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1/5</u> Slopebreak buffer plus 25' for windfirmness. Stream# <u>2</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>MM1/HC5</u> Buffer the stream approximately 250 feet on the west side and 100 feet past the slopebreak on the east side. The MM1 portion on the east side requires a 120' buffer (MM1 is where average gradient is <6%). This stream is a permitted <u>domestic water supply</u> stream for Sallery Cove residents. Stream# <u>3</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> Fall and yard away where practical and leave non-merchantable trees along the stream. This stream has been deleted from the unit. Stream# <u>4</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Streams 2, 4, 5, 6 & 7 are used as a domestic water sources. Slope break buffer plus additional windfirm zone as needed to maintain integrity of riparian management area (mostly outside of unit). Stream# <u>5</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1</u> Tributary to Stream #4. Although stream does not meet bankful width and incision criteria for Class III, additional protection is warranted to maintain downstream water quality. Stream parallels current road location at base of unit. Alternate road locations should be explored to minimize connectivity of road and stream networks. Streams# <u>6 and 7</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1</u> . These small streams form the headwaters for Stream #4. Although streams do not meet bankful width and incision criteria for Class III, additional protection is warranted to maintain downstream water quality for <u>domestic water source</u> . Small catchment in the northeast corner of the unit encompassing Streams 6 and 7 should be buffered with consideration of windfirmness (approximately 2 acres). BMP 12.6, 13.16
L. Mosenthin A.Moore 6/24/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Majority of unit a western hemlock/western red cedar/blueberry/salal plant association. The 1,000 foot estuary (tall sedge fen) buffer may have a small effect on the extreme northern boundary of this unit. Retention of acreage for high value marten habitat, 2.6-3.9 acres, needs to be in the western half of the unit or extreme north eastern corner only.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: Adjacent to state encumbered lands. Estuary Buffer may be further into unit then state boundary. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See discussion under unit 614-001a RECREATION: Unit is located above the community in Sallery Cove. Re-design of the unit to a higher visual quality objective (as recommended in the Visuals section) would reduce impacts to the recreation setting in Sallery Cove.

PRESCRIPTION: Alts. 2,4,5: One entry proposal. Reserves for visual, marten, and drinking water mitigation. Combination of even-aged clear-cut with reserves (type c) on the top, steep areas, and an even-aged clear-cut w/reserves (type A) on the northern portion; retain <15% of cutting unit overall, or <30CCF, where feasible and safe. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCU's where < 33% of existing POG has been converted to young growth stands. These apply only to the western 1/3 & the northeast corner of the unit. They require 2.6-3.9 acres of structural retention for high value marten habitat credited in: 2 acres in stream #1 class III slope-break buffer (only the northern 1/3 of this buffer is marten habitat) and additional RAW buffer(125'x670'). Additional credit for 1 acre can be achieved by feathering the backline in the SW corner of the unit. In SW corner, for visual retention, layout several alternating corridors of cut and leave. These should be ~200 ft. wide on about 5 acres of the steepest portion of the unit. Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates to 104 live trees >20"dbh and 78 snags >20"dbh. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave.

To achieve partial retention VQO in the upper eastern portion of the unit, feather backline and type C clearcut with reserves(unmerchantable), helicopter yard above cliffs.

Soils partial suspension requirements and downhill yarding will force the use of slackline cable logging above the road possibly shovel on lower portions of unit. Slackline logging system is anticipated on steep western parts.

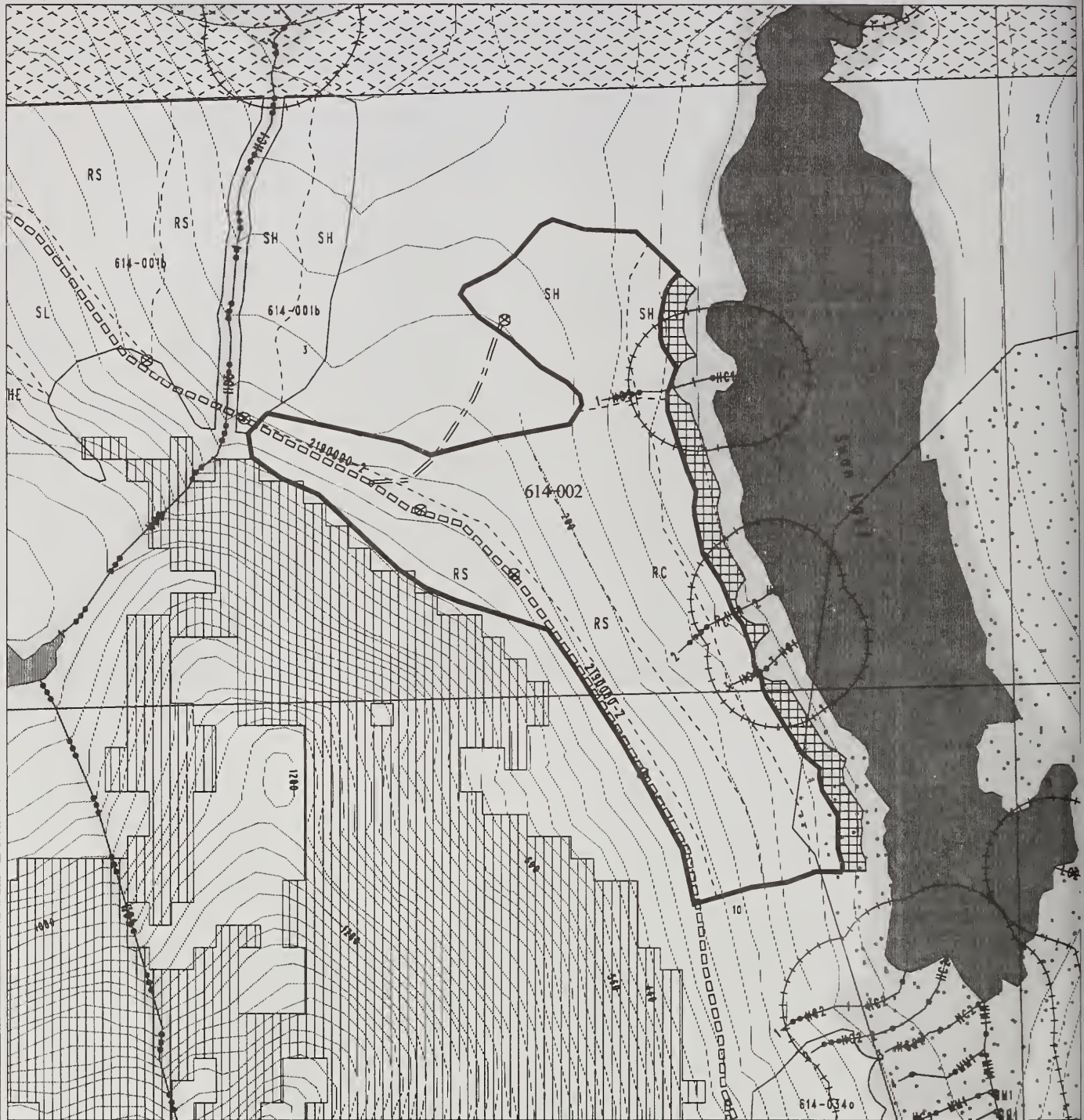
Est. vol. alt 3 = (20x7)+(28x5)+(15x7)+(20x7)+(22x19)+(15x8)+(20x15)+(15x4)+(22x24). Est. vol. alt 5 unit A&B = (30x36)+(15x9)+(25x9)+(15x5)+(25x45). Future activities: regeneration survey, precommercial thinning at 15 to 25 years. Unit may be adjacent to 1000' estuary buffer.

PROTECT POTENTIAL DOMESTIC WATER STREAM #2. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevent contamination from oil spills, and potential written agreements adjacent to the state lands.

Alt. 3 option: Part of retention carries into unit 1b from the eastern stream in 1a. 50% BA removal in the western part of the unit (> or = 23"dbh removed, 15mbf x 5ac = 75mbf). Eastern stream: same no cut buffer as in other alternatives, add variable buffer of ~250' each side of stream, 50% removal, (>or = 23"dbh, 20mbf/ac x 15ac = 300mbf). Area above cliffs at the top: 50% BA removal, ≥23" dbh, (15mbf/ac x 4 ac = 60mbf). Rest of the unit between buffers: 75% BA removal retain ≥or =18"dbh, (20 miff/ac x 24ac = 672 miff). These treatments are called Two-aged clear-cuts with reserves Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two structured stand. 1) Retention to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2). Distribution. Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3). Size of opening. The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



Cholmondeley DEIS Unit 614-002



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Sallwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Monoged Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beech Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-002 ACRES: 59 VOL: alt 3-1050, alt 5-1372 MBF ALTERNATIVES: 2-5

PHOTO YR#: '91/590-77 1/4 QUAD: ELEV. RANGE: 100-300 ASPECT: NE LOGGING SYSTEMS: RS, SH

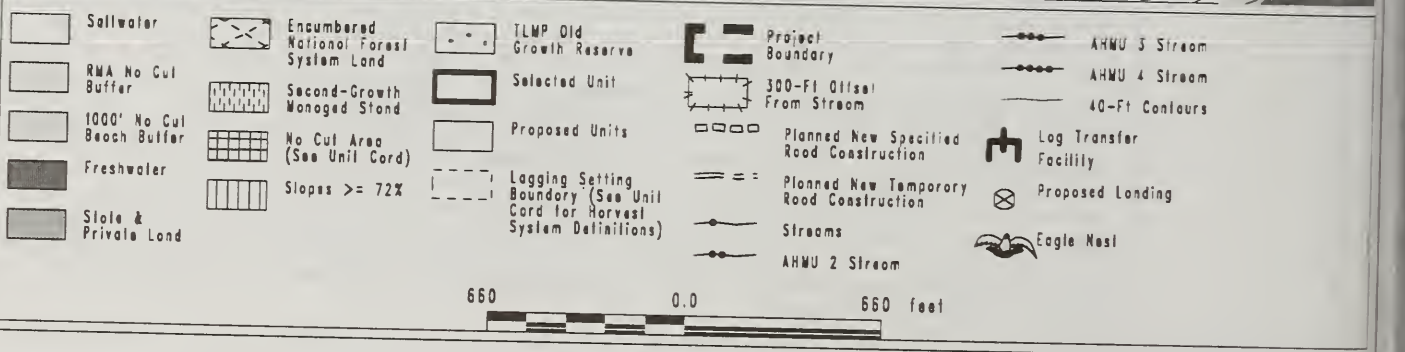
WATERSHED#: F37A NAME/CAT#: Swan Lake ROAD#: 2190000-2 WINDTHROW RISK: High at hi elev., Low at low elev.

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F18, F21, T4, W1, W6, W7, W20, W28, V1, V4, V6, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER exam stds 8; super std net volume 24 MBF/AC; heavy mistletoe & rot, many snags & cedar- dieback; WT risk high above, low below; logging system options, R.S. shovel helicopter; site production moderate; 37 acres of high volume strata which requires 3.3-6.6 acres of structural retention.
Jack Oien	TRANSPORTATION - NO CONCERNS. SEE ROAD CARDS FOR ROADS LISTED ABOVE.
D. Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 60 percent in unit 002. Landslide potential is moderate. Cliffs form a portion of the unit backline (BMP 13.2). The northern third of the unit is a cedar-hemlock-blueberry forested wetland. Use partial suspension to minimize impacts to soil and wetland resources (BMP 12.5, 13.5 and 13.9). Three class 4 streams drain the unit. The riparian areas are small and indistinct on these streams (BMP 12.6). Saltery lake has a lakeshore riparian area that will be entirely within the lake buffer (BMP 12.6a). There is a small colluvial fan associated with one of the streams in the south end of the unit. The fan is stable and none of the streams require buffers. See fisheries section for streamcourse protection measures (BMP 12.6a and 13.16).
P. Moore T. Paul 6-24-97	FISHERIES Swan Lake: Class I lake with high fishery and recreation values. The lake requires a 200' no-cut buffer and an additional partial cut buffer the height of one site potential tree (approximately 100') Stream# 1 Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>HC1/5</u> Class I portion: 100' buffer, Class IV portion will not be buffered. Stream# 2 Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC1</u> Class IV portion will not be buffered. Stream # 3 Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>HC1</u> Class I portion 100' buffer. Class IV portion will not be buffered. Class IV streams; fall and yard away when practical and leave non-commercial trees along streams. BMP 12.6, 13.16
L. Mosenthin A. Moore 6/25/97 M. Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. The 200-foot lake buffer (except for the extreme southerly one) acreage cannot be counted as retention for marten habitat. The required marten habitat, 3.3-6.6 acres, may be counted in the additional 100 partial cut buffer on the lake. There are unconfirmed reports of swans wintering and possibly nesting on the lake. Avoid disturbance within 1/2 mile when wintering. Buffers should provide habitat protection.
T. Fifield 10/18/98 J. Short J. Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: FS archaeologists surveyed this unit during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: Adopted visual objective for this viewshed is maximum modification. This unit will produce a long highly visible backline and long visible area of harvested ground above the lake buffer if entire unit clearcut. This would not meet maximum modification VQO. Initial prescription of incorporating a partial cut above the lake buffer and below the road will significantly lessen visibility of harvested ground. However, from east side of lake, the back line will still be clearly visible. Backline has been lowered during reconnaissance. Breaking up the visibility of backline and screening most of the harvest ground will enable this activity to meet a partial retention objective in this foreground viewshed. RECREATION: Unit is located adjacent (parallel) to Swan Lake, an inventoried recreation site. The unit was redesigned to retain a primitive to semi-primitive non-motorized setting in the lake basin to reduce impacts to the recreation setting.
G. Lawton 3/00	<u>PREScription: Alts. 2,4,5: One entry proposal. Reserves trees for visual/recreation/marten mitigation. Combination of even-aged clear-cut with reserves (type D) and no-cut corridors near the lake; retain at least <15% of cutting unit overall, or <30CCF, where feasible and safe. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to the central 3/4 of the unit. They require 3.3 acres of structural retention for high value marten habitat can be credited in: islands or fingers within the unit, steep and unstable slopes dropped due to soil steepness, Mcgilvery content or other problems. "additional" 100' lake buffer(above 100' required), and/or from 100' partial cut area. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates to 148 live trees >20"dbh and 111 snags >20"dbh. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Trees near streams are to be directionally felled toward the landing and carefully yarded out of the buffers.</u> Even-aged clear-cut with running skyline for 300' below the road. Then to provide additional visual mitigation along the lake, use running skyline to yard 200' wide cut corridors, perpendicular to the road, tapering (narrowing) upslope, alternating between no-cut corridors just above the 200' no cut zone along the lake. Estimated volume alt 5[(30x25)+(16x40)+(15x15)] - 15%. Est. vol. alt 3 (15x2)+(12x14)+26x27=1050. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and precommercial thinning at 15 to 20 years. <u>Alt. 3 options:</u> same 200' no-cut buffers, additional 200' of 50% BA removal24"dbh(no data), (15mbf x 12ac = 180mbf). <u>Area above and 100' below the road:</u> 50% removal by BA, (12mbf/ac x 14ac = 168mbf). <u>Rest of unit:</u> 75% BA removal, (25x30)+(40x16)+(15x13) (.85)=1347mbf. The varying BA removals called <u>Two-aged clearcut with reserves</u> . Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



Cholmondeley DEIS Unit 614-005



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-005 ACRES: 21 VOL: 567 MBF ALTERNATIVES: 2-5

PHOTO YR/#: '91/590-75 1/4 QUAD: ELEV. RANGE: 900-1100 ASPECT: SE LOGGING SYSTEMS: HE

WATERSHED#: F37A03 NAME/CAT#: Saltery/102-60-05 ROAD#: none WINDTHROW RISK: LOW

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W7, W28, V1, V4,). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G.Lawton 9/98	SILVICULTURE/TIMBER Superstand Net Vol/ac=45,513 data suspect.; Insect and Disease moderate; WT risk low, moderate rot, high elevation; logging system options-helicopter only; 1 story, productivity moderate; Site Productivity+2; Average Site Index (50yr)=100
Jack Oien	TRANSPORTATION
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 80 percent in unit 005, with about 1 acre of slopes over 72 percent gradient. Landslide potential is moderate and high in the unit. There are about 3 acres of forested wetlands along the east unit boundary. Numerous water quality streams with riparian areas below the slope-break. (BMP 12.6). See fisheries section for streamcourse protection measures (BMP 12.6a and 13.16). Riparian areas, including one small alluvial fan will be entirely within stream buffers (BMP 12.6a). Use full suspension to maintain slope stability, stream buffers and protect wetlands (BMPS 12.5, 13.5, and 13.9).
P.Moore T.Paul 6/26/97	FISHERIES Stream # <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>MM1/HC1</u> 120' buffer (MM1) and slopebreak buffer (stream probably not in unit). Stream# <u>2</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC1/5</u> Slopebreak buffer recommended, stream is near southeast unit boundary. Stream# <u>3</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>AF2</u> Stream not buffered. Stream # <u>4</u> Class <u>III/IV</u> Flagging <u>OW/GW</u> C-type <u>HC1/HC5</u> Slopebreak buffer on class III portion. Stream# <u>5</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>AF2</u> 140' buffer required on alluvial fan channel (to 940' elev) then 25' buffer HC5. Stream# <u>6</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>AF2/HC5</u> 140' buffer on alluvial fan and 25' buffer on HC5 portion. Stream# <u>7</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>AF2/HC5</u> 140' buffer from alluvial fan and 25' buffer on HC5 portion. BMP 12.6, 13.16.
L.Mosenthin A.Moore 6/26/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. . This unit requires 0.9 to 1.8 acre of structural retention of high value marten habitat. This structure needs to be located on the southern half of the middle setting or the northern half of the southern setting. This may be accomplished in the buffer on stream #5. This unit is adjacent to an old growth reserve.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns RECREATION: Unit is not expected to have direct impacts to the recreation setting.
G. Lawton 3/00	PRESCRIPTION: Single entry planned. Reserve trees for marten habitat mitigation. <u>Even-aged clear-cut type C with reserves; retain <15% of cutting unit overall, or <30CCF, where feasible and safe.</u> TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to the <u>central 1/2</u> of the unit. They require <u>0.9-1.8</u> acres of structural retention for high value marten habitat credited in: <u>6 acres in stream buffers</u> . The stream in the northern most setting and the one in between the northern setting and the middle setting are not high value habitat and these buffers will not count towards marten acres. Additional structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates to <u>36</u> live trees >20"dbh and <u>27</u> snags >20"dbh. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Use: type C clear-cut, helicopter logging. Type C clearcuts would leave non-merchantable trees and safe snags over the entire unit.. Large snags in the center of the unit may also present a problem due to prop wash and log-line contact. Full suspension is required for soil protection. Possible fall down due to economics of helicopter logging. Low volume at NE end. May require planting of yellow cedar at this high elevation site. Acres dropped due to alluvial fan. Estimate volume (30MBFx21)x.90 =567MBF. Future activities: regeneration surveys, & pre-commercial thin @ 20-25 yrs. <u>Alt. 3 options:</u> The varying BA removals could be called Two-aged clearcut with reserves., > or = 16"dbh, 30mbf/ac x 21 ac(.90) = 567mbf. (Slight volume reduction anticipated.) Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



Cholmondeley DEIS Unit 614-034a



Saltwater	Encumbered National Forest System Land	TLMP Old Growth Reserve	Project Boundary	AHMU 3 Stream
RWA No Cut Buffer	Second-Growth Managed Stand	Selected Unit	300-Ft Offset From Stream	AHMU 4 Stream
1000' No Cut Beach Buffer	No Cut Area (See Unit Card)	Proposed Units	Planned New Specified Road Construction	40-Ft Contours
Freshwater	Slopes $\geq 72\%$	Logging Setting Boundary (See Unit Card for Harvest System Definitions)	Planned New Temporary Road Construction	Log Transfer Facility
State & Private Land			Streams	Proposed Landing
			AHMU 2 Stream	Eagle Nest

660 0.0 660 feet

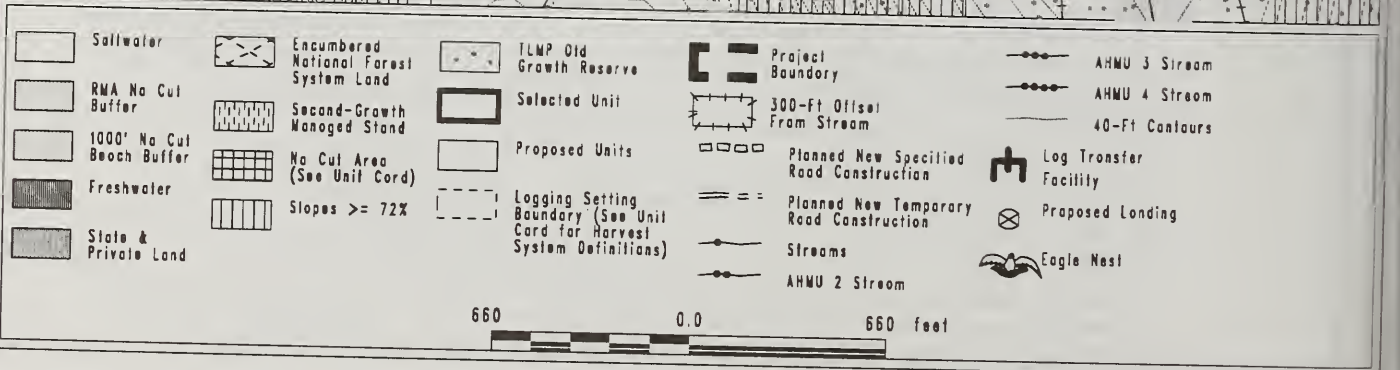
CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-034A ACRES: 15 VOL: See B MBF ALTERNATIVES: 2-5

PHOTO YR/#: '91/590-76-77 1/4 QUAD: ELEV. RANGE: 100-500 ASPECT: E LOGGING SYSTEMS: RS

WATERSHED#: F37A NAME/CAT#: SALTARY/102-60-05 ROAD#: 2190100, 2190000-2 WINDTHROW RISK: Medium
 The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W7, V1, V4, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands= 40 & 41; Superstand Net Vol/ac= 34,116; Insects & Disease: Mistletoe- very high, Rot- high; Downhill Yarding- 5%; Windthrow risk- moderate; Logging Systems Options- Running Skyline; Regeneration System Options- Clearcut-type D & Corridor-type GS; Site Productivity- 3; Average Site Index (50yr)- 80. "0" acres of high value marten habitat.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS
D.Landwehr 2/00	SOILS/WATERSHED: Slopes range from 30 to 70 percent gradient in unit 034a. There is approximately 1 acre of slopes over 72 percent gradient in the unit, and only minor areas of forested wetlands. Landslide potential is moderate and high in the unit. Stream 7 has had a relatively recent debris torrent. The north end of unit 034a includes a younger second-growth stand on a recent colluvium deposit. The organic mat is thin on the recent colluvium. Use a minimum of partial suspension to mitigate landsliding keep soil displacements within soil quality standards (BMP 13.5 & 13.9). There is a large lakeshore tall sedge fen riparian area at the head of Sallery Lake, downslope of the unit. There are minor slope-break and colluvial riparian areas on the water quality streams (BMP 12.6). The lakeshore riparian area will be entirely within the buffer (BMP 12.6a and 13.16). See fisheries section for specific streamcourse protection measures (BMP 12.6a and 13.16).
J.Hannon S.Farzan 6-24-97	FISHERIES Stream# <u>1</u> Class <u>I</u> Flagging <u>BW/GW</u> C-type <u>HC2/5</u> Class I portion requires a 100' buffer. Class IV portion will not be buffered. Stream# <u>2</u> Class <u>I</u> Flagging <u>BW/GW</u> C-type <u>HC2/5</u> Class I portion requires a 100' buffer. Class IV portion will not be buffered. Stream# <u>3</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>HC2</u> Requires a 100' buffer. Stream# <u>4</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>MM1</u> Requires a 120' buffer on MM1 channel type. Stream# <u>5</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>MM1/HC5</u> Requires 120' buffer until average gradient exceeds 6% then 100', class IV portion not buffered. Stream# <u>6</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>HC2</u> Requires 100' buffer. Stream# <u>7</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC5</u> Class I portion: 120' buffer, Class III portion: No harvest in slopebreak, beyond the slopebreak leave a partial cut buffer leaving all trees 24" or less DBH out to 50' from the channel for future LWD recruitment. Timing required for road construction. Stream# <u>7A</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> This stream will not be buffered. Stream# <u>8</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC5/AF1</u> Class I portion 120' buffer, Class III HC5 portion slopebreak buffer, Class III AF1 portion requires a 140' buffer from the channels. Stream is boundary between part A & B of the unit. Stream# <u>8A&B</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> These streams will not be buffered. Class IV streams: Fall and yard away from streams where practical and leave non-commercial trees along streams. BMP 12.6, 13.16, 14.6
L.Mosenthin A.Moore 6/25-26/97 M.Dillman 4/99	WILDLIFE: Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar plant association with forbs and ferns. There is no habitat within this unit that qualifies as high value for marten. There may be a distance requirement for helicopter flight paths if there is activity in this area when wintering swans are present are the lake.
T.Fifield 10/18/98	GEOLOGY/MINERALS: --- LANDS: No concerns.
J.Short	CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns.
J.Kluwe	VISUALS: Recommend that units 614-034a and 034b (middleground viewshed) be designed to meet modification visual objective in order to keep level of impact comparable to 614-002 that is in the foreground. Unit blends into landform well, but recommend that scale of harvest be reduced with some leave areas. RECREATION: Unit is located adjacent to Swan Lake, an inventoried recreation site. The unit was re-designed to retain a primitive to semi-primitive non-motorized setting in the lake basin to reduce impacts to the recreation setting.
G. Lawton 3/00	PRESCRIPTION: Alts. 2,4,5: Single entry planned. Reserve trees for wildlife and visual mitigation. <u>Even-aged clear-cut type A w/reserves</u> : retain 5% of cutting unit, where feasible and safe. Areas should be in clumps or patches, buffers or blind leads, dispersed, and should contain large live trees and hard snags. Use: Type A clear-cut which calls for an unspecified number of unmerchantable trees retained in 50 to 100 feet of the border. Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. See stream section for buffer requirements. Keep road high in unit. Due to high windthrow hazard stream #7 requires an additional 50' RAW buffer. This will also mitigate visual impacts. Leave good phenotypic cedar and spruce as leave trees in buffers. No high volume strata exist in unit. Due to medium windthrow hazard, 2 storied stand, heavy mistletoe and rot content, this unit is not a good stand for alternative harvest systems. Yarding system difficulties due to: Use of split lines on streams. Stream buffers in NE areas and merchantable reserve trees on the edges of the unit. Addressed structure needs for wildlife through the buffers. Estimate volume (Est. vol. alt 3 (25.7x5)=385.5. EST VOL. ALT 5 (24MBFX14)X.95=452.5 MBF. R.S. logging system is anticipated on all of unit. Previously deleted acres for high MMI. Future activities: regeneration surveys, Sitka Spruce planting, seed collection, survival survey, and precommercial thinning at 20-25 years. Partial suspension required for soil protection. <u>Alt. 3 options</u> : The varying BA removals could be called <u>Two-aged clearcut with reserves</u> , >or= 20 "dbh, are removed (34mbf/ac x 14ac x .95 = 452.2mbf.) Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 614-034B ACRES: 65 VOL: ALT 5 2622 ALT 3 2276 MBF ALTERNATIVES: 2-5

PHOTO YR#: '91/590-76-77 1/4 QUAD: ELEV. RANGE: 400-900 ASPECT: E LOGGING SYSTEMS: RS,SL,SH,LS,HE

WATERSHED#: F37A NAME/CAT#: SALTARY/102-60-05 ROAD#: 2190100, 2190000-2

WINDTHROW RISK: Moderate to high

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W7, V1, V4, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 46 & 52; Superstand Net Vol/ac= 46,855; Insects & Disease: Cedar dieback-high, Mistletoe-high, Rot-medium; Downhill Yarding- 30%; Windthrow risk- medium; Logging Systems Options: Helicopter, Running Skyline, Shovel & Slackline; Regeneration System Options- Clear-cut-typeD & Overstory Removal-type 24; Site Productivity- 3; Average Site Index (50yr)- 80. "0" acres of marten habitat. Existing windthrow.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 90 percent gradient in the unit. Approximately 3 acres of slopes over 72 percent occur mostly in the southern portion of the unit below the upper road. Landslide prone terrain occurs in the southern-most cable yarding setting just downslope of the last landing (BMP 13.5). The unit boundary was modified following reconnaissance to exclude 8 of the eleven acres of slopes over 72 percent (BMPs 13.2 and 13.5). The landslide prone terrain in the northeast corner is part of a leave area below a cliff. The southern-most stream has a relatively recent debris torrent. A large cliff also occurs in this area, and is excluded from the unit. Windthrow potential appears high long the upper unit boundary. About 10 acres of forested wetlands occur on the gentler slopes mid-unit. Use a minimum of partial suspension throughout the unit to prevent landsliding and to minimize impacts to forested wetlands (BMPs 12.5 and 13.9). If possible locate the reserve tree group below the cliff and on the landslide prone terrain (BMP 13.5 and 13.2). Use the water quality stream buffer to the south of the unstable soil area to prevent blowdown of the reserve tree clump. (BMP 13.2, 13.5 and 12.6a). Riparian areas occur below the slope-breaks on the larger water quality streams (BMP 12.6). The riparian areas will be entirely within the buffers. See fisheries section for specific streamcourse protection measures (BMPs 12.6a and 13.16).
J.Hannon S.Farzan 6/25/97	FISHERIES Stream# <u>8</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC5/AF1</u> Class I portion 120' buffer, Class III HC5 portion slopebreak buffer, Class III AF1 portion requires a 140' buffer from the channels. Stream is boundary between part A & B of the unit. Stream# <u>9</u> Class <u>III/IV</u> Flagging <u>OW/GW</u> C-type <u>HC5</u> Slopebreak buffer on class III portion, no buffer on class IV. Lower portion of class III was not checked for fish following unit expansion towards Sallery Creek--check during layout. Stream# <u>10</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5/HC2</u> Slopebreak buffer prescribed. Stream# <u>11</u> Class <u>IV</u> Flagging <u>Not flagged in field</u> C-type <u>HC5</u> No buffer. Make call during layout whether class IV or non. Stream# <u>12</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5/HC2</u> A debris torrent came down the channel in the past. A 50' buffer is prescribed for the stream due to the instability of the area. The lower reaches of the stream are flagged OW but need to be checked for fish during layout. There is access from Sallery Creek and the lower part could be class II requiring a TTRA buffer. Unit expanded to the east following recon. Coho timing will be needed if a road is built across these streams. Fall and yard away from class IV streams if practical and leave non-commercial trees along streams. BMP 12.6, 13.16, 14.6
L.Mosenthin A.Moore 6/25/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Wildlife leave area in northeast setting below knob and cliffs. Another wildlife leave area southeast setting (not helicopter setting) between the roads. There is not high value marten habitat in this unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See discussion under unit 614-034a RECREATION: Unit is to the south of Swan Lake, an inventoried recreation site. The unit was re-designed to retain a primitive to semi-primitive non-motorized setting in the lake basin would reduce impacts to the recreation setting.

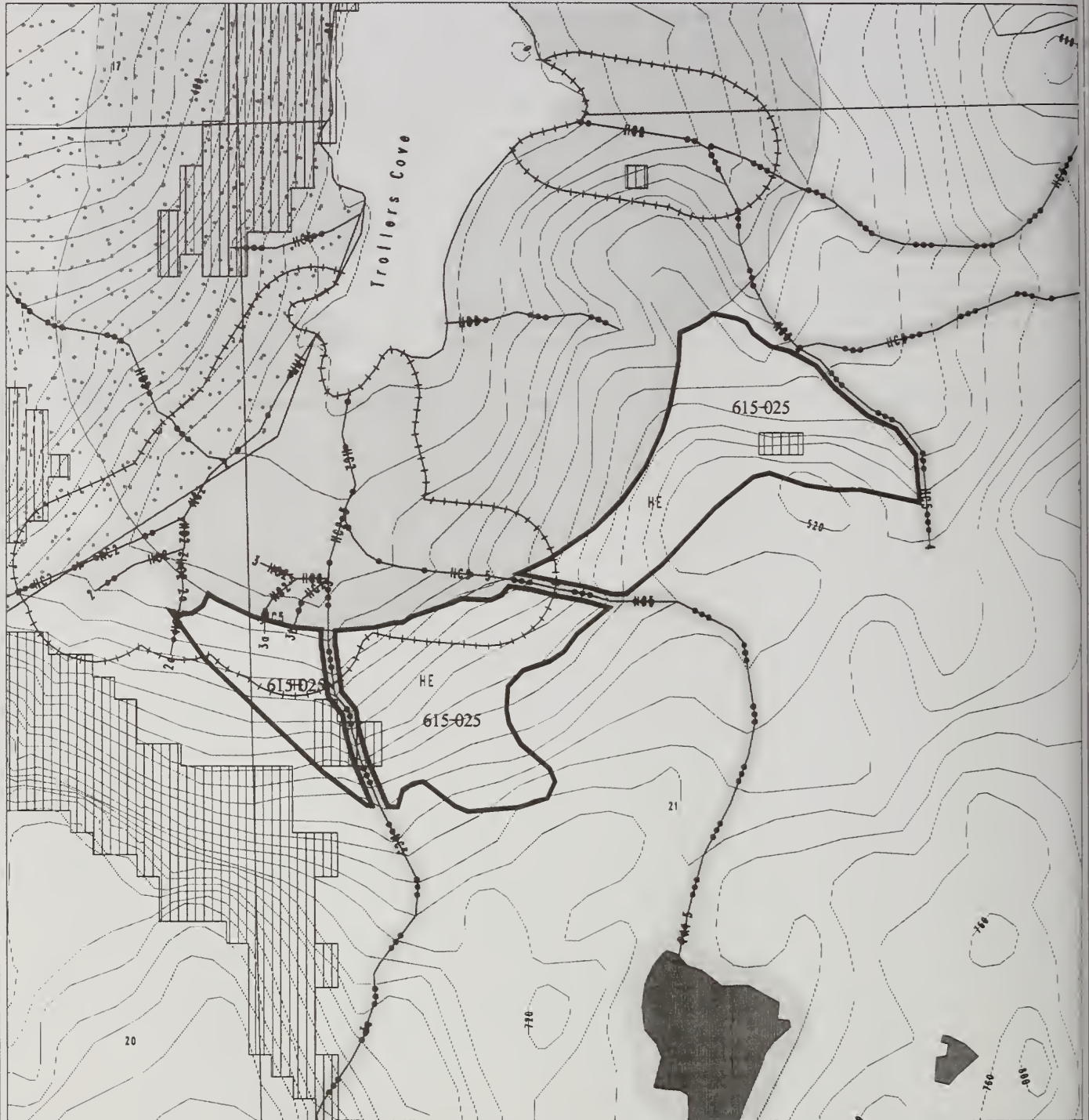
G. Lawton
3/00

PRESCRIPTION: Alts. 2,4,5. Single entry planned. Reserve trees left for wildlife, visuals and soil protection mitigation. Even-aged type B clear-cut w/ reserves and type C for helicopter portion: retain 5% of cutting unit, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Type B clear-cuts call for a specified number of snags and live (8-10 trees/AC) replacements with minimum diameter limits of 16" dbh retained in 50 to 100 feet of the border. Due to the flexibility of the interior setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. No high volume strata exist in unit. Center of unit partial suspension to be achieved for soils protection. Southern 1/3 of unit is difficult yarding due to terrain. Roads need to be on bench above cliff area. Southern-most stream may be difficult to cross; helicopter is anticipated to avoid crossing (major waterfall above). Backline is unstable, expect falldown in unit size and volume along backline and possibly across southern stream. Roading is also difficult between units 34A & 34B. Unstable, steep yarding, high windthrow risk, 2 story, high mistletoe infection all deter "alternatives to clear-cut" options. Several leave islands created below the cliff in center setting and near cliffs at north end will mitigate soil concerns. Planned buffers will mitigate visual concern. Estimate volume alt 5 (4MBF6x60)x 95%=2622. Alt 3 (35MBF6x65Ac)=2276. Buffers, blind leads and merchantable trees left along boundary provide for wildlife structural needs. Leave non-diseased hemlocks along the boundary. Previously deleted acres for high MMI soils. Future activities: regeneration surveys, 10 acres of Yellow Cedar planting, seed collection, survival survey, and precommercial thinning at 20-25 years. Unit adjacent to existing Old Growth Reserves (HCA). No high value marten habitat in this unit.

Alt 3 options: Varying BA removals called Two-aged clearcut with reserves with > or = 20" dbh removed. Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) Retention to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2). Distribution. Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3). Size of opening. The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. See BMPs listed above.



Cholmondeley DEIS Unit 615-025



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|---------------------------|--|---|---|-----------------------|
| Sollwater | Encumbered National Forest System Land | TLWP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 615-025 ACRES: 39 VOL: 1042 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/490-59,60 1/4 QUAD: ELEV. RANGE: 300-500 ASPECT: N LOGGING SYSTEMS: Helicopter

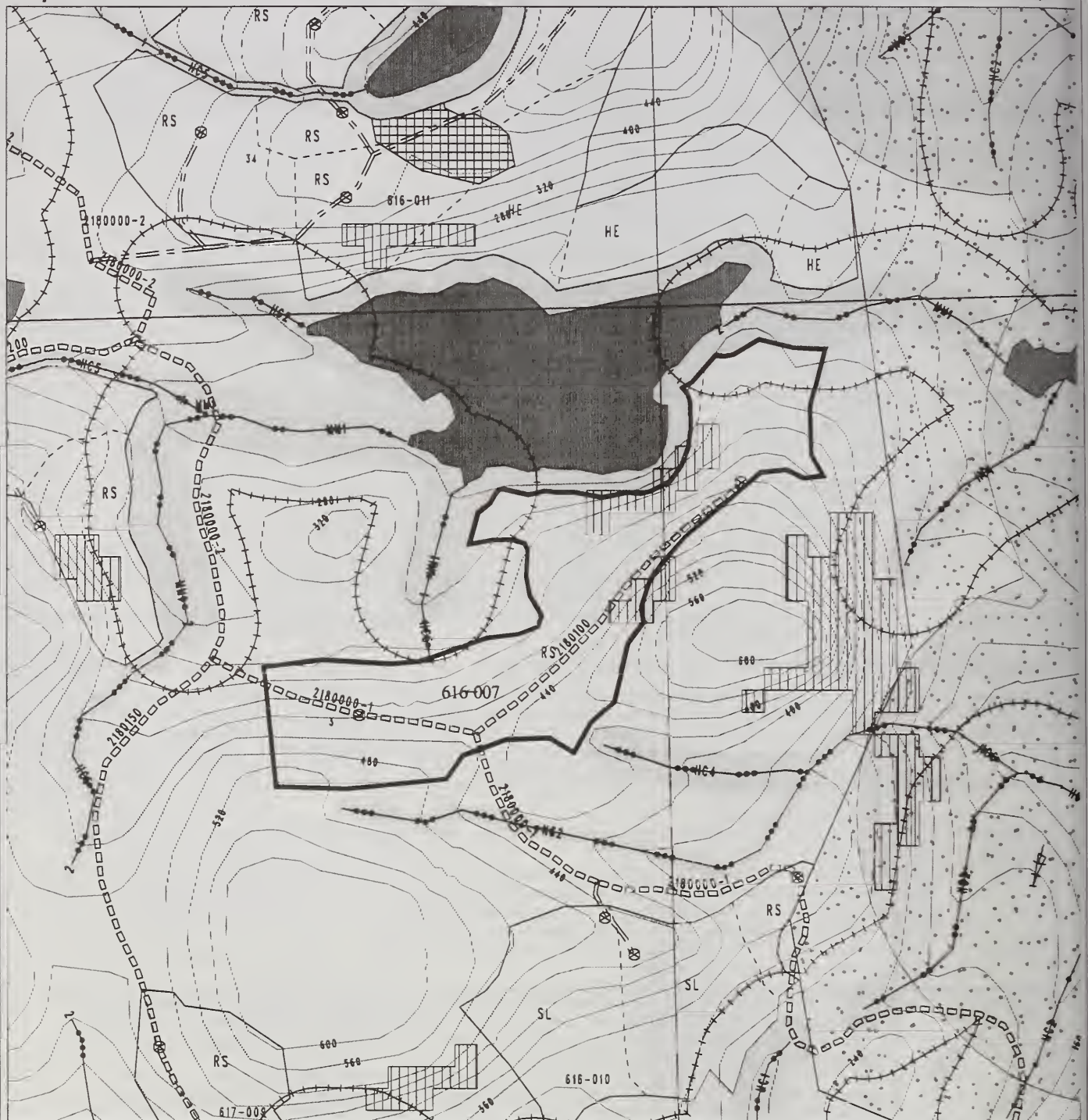
WATERSHED#: F35A/000Z NAME/CAT#: TROLLERS EAST/102-50-35 ROAD#: none WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T1, W7, W28, V8,). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands= 64, 63, & 32., Superstand Net Vol/ac= 47,822., Downhill Yarding= 50%, Windthrow risk= moderate, Logging Systems Options= Running skyline. Site Productivity= 4-2, Average Site Index (50yr)= 80-100. Very large trees Existing windthrow.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 80 percent gradient in the unit. There is approximately 1 acre of slopes over 72 percent gradient. Forested wetlands occur along the south, southeast boundary. Full suspension will be achieved via helicopter yarding. Full suspension is adequate to minimize landsliding and impacts to wetland resources (BMPs 12.5, 13.5 & 13.9). Six fish streams and three water quality streams have been identified in and around unit 025. Most of the fish streams are in the estuary buffer. Riparian areas are small and indistinct in the unit (BMP 12.6). The estuary and stream buffers will include all the identifiable riparian areas. See fisheries section for specific streamcourse protection measures (BMP 12.6a and 13.16).
S.Farzan J.Hannon 7/15/97	FISHERIES Stream# <u>1</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC2</u> MM1 channel requires 120' buffer and HC2 requires 100' where class I and the greater of slopebreak or 50' buffer where class III. Stream# <u>2</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>HC2</u> A 100' TTRA buffer is required. Stream# <u>2A</u> Class <u>IIA/IV</u> Flagging <u>BW/GW</u> C-type <u>HC2</u> Class IIA portion requires 100' TTRA buffer. Stream# <u>3</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>HC2</u> A 100' TTRA buffer is required. Stream# <u>3A</u> Class <u>IIA/IV</u> Flagging <u>BW/GW</u> C-type <u>HC2</u> 100' TTRA buffer on class IIA, no buffer on class IV. Stream# <u>3B</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>HC2</u> 100' TTRA buffer. Stream# <u>3C</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Slopebreak buffer required. Little incision at bottom, but more higher up. Stream# <u>4</u> Class <u>III</u> Flagging <u>not flagged</u> This stream is near the east unit boundary. It was only walked above unit but recommend keeping unit boundary above slopebreak. Stream# <u>5</u> Class <u>I/III</u> Flagging <u>OW</u> C-type <u>HC2/5</u> A 100' TTRA buffer is required on the class I portion and a slopebreak buffer is required on the class III portion. BMPs 13.16, 12.6, 14.6
A.Moore D.Newell 8/12/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. This unit is a western hemlock/western red cedar/blueberry/salal plant association. Approximately 2.1-4.2 acres need to be retained in the southern portions of the unit to meet marten habitat requirements. This unit has been identified as a travel corridor for wildlife by other agencies and this issue should be addressed by the helicopter logging and the structure that will be left in the unit. This unit is adjacent to an estuary (tall sedge fen) buffer and an old growth reserve.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: The visual management objective for the Trollers Cove area is maximum modification. Due to the importance of this area for boaters, recreation cabin users, and fishers, recommend that the impact of this unit at the scenic focal point of this bay be lessened somewhat by retaining some of the forested texture within the unit. This will soften the distinct edges that would otherwise be highly evident in this relatively large volume stand of timber. RECREATION: Unit is located above Trollers Cove Cabin (FS Cabin). See visuals section for design comments related to the recreation setting.
G. Lawton 3/00	PRESCRIPTION: One entry proposal. Reserves for visual and marten mitigation. <u>Even-aged management Overstory Removal (OSR)</u> , cut all trees >21.0 inches DBH. Northern 1/2 will appear less impacted because of low number of trees >20". This treatment should remove ~ 63% of the BA and 20% of the trees/ac.; generally need to retain <15% of <u>cutting unit overall</u> , or <30CCF where feasible and safe. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to the <u>southern 1/2 of the unit</u> They require <u>2.1-4.2</u> acres of structural retention for high value marten habitat credited in: <u>the relatively uniform distribution of leave trees</u> . These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to <u>84</u> live trees >20"dbh and <u>63</u> snags >20"dbh that need to be retained. These should be available in the leave areas mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Dropped road at unit(616-024). Helicopter unit mainly for visuals structural retention and marten habitat retention on the southern 1/2 of the unit. South 1/2 of unit has big trees Estimate volume alt 5: (35x20MBF)+(20x19MBF)x90%. Unit near to existing Old Growth Reserves (HCA). Future activities: none. Soils partial suspension is required on the southern 1/2 of unit. Adjacent to 1000' beach buffer. To achieve partial retention VQO in the upper eastern portion of the unit, OSR and stream buffers screen the unit. See BMPs listed above.



Cholmondeley DEIS Unit 616-007



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-007 ACRES: 33 VOL: 520 MBF ALTERNATIVES: 2, 3, 4, 5

PHOTO YR/#: '91/490-75,74 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT: NW LOGGING SYSTEMS: RS

WATERSHED#: DD5A/DD4A NAME/CAT#: South of Monie/102-50-27 ROAD#: 2180100 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W4, W7, V1, V4.). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands= 10; Superstand Net Vol/ac= 20,444; Insects & Disease: Cedar dieback= high, Mistletoe= high; Downhill Yarding= 15%; Windthrow risk= low; Logging Systems Options= Running Skyline; Regeneration system options= Clearcut-type D1/2 and Group Selection1/2. Site Productivity= 4; Average Site Index (50yr)= 75. Low volume.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 75 percent gradient, with about 2 acres of slopes over 72 percent gradient in the unit. Landslide potential is moderate and high. About 40 percent of the unit is forested wetland. Partial suspension is required to minimize landslide potential and impacts to soil and wetland resources (BMPs 12.5, 13.5 and 13.9). The unnamed lake north of unit 007 has a poorly defined lakeshore riparian area that will be entirely within the lake buffer (BMPs 12.6 & 12.6a). Two small streams with poorly defined riparian areas drain the unit. The riparian areas are entirely within the stream buffers. See fisheries section for specific streamcourse protection measures. (BMPs 12.6a and 13.16)
P.Moore S.Farzan 6-12-97	FISHERIES Stream# <u>1</u> Class <u>IIA/IV</u> Flagging <u>BW/GW</u> C-type <u>MM1/HC5</u> Class IIA portion: 120' buffer. Class IV portion: no buffer Stream# <u>2</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>MM1</u> Class IIA portion: 120' buffer. Lake: Class <u>IIA</u> Leave a 100' no cut buffer and an additional 100' of partial cut. BMP 12.6, 13.16
L.Mosenthin D.Newell 6/18/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. . There is no high value marten habitat within this unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: FS archaeologists surveyed this unit during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Recreation use in the area is light.
G. Lawton 3/00	PRESCRIPTION: Reserves for fisheries buffer on lake. Two-aged management, clearcut w/ reserves tending toward 2-aged structured stand with leave strips (eastern 1/2). And the western 1/2 is even-aged management clearcut w/reserves type D, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. Type D clearcut, on western 1/2 of unit. Type D clear-cuts would provide clumps of reserve trees in islands or fingers within the unit. This type can be implemented where rock outcrops, cliffs, or blind leads make harvesting uneconomical or infeasible. In addition, clumps of reserve trees can be left in other areas if helicopter or cable yarding with lateral yarding capability is the logging system to be employed. A type D clear-cut can be prescribed by itself or in combination with one of the other types. No high volume strata or marten habitat exists in unit. Soils partial suspension is required on the steep eastern edge of the unit. Low windthrow risk, shorter trees, road is high for uphill yarding all contribute to two-aged options. Eastern half of unit can use alternating cut/leave corridors perpendicular to the road, as long as criteria for 2-aged mgnt above are met. Corridors of 100' width with 100' spacing between corridors. This 100' partial cut lake buffer occurs above the 100' no cut lake buffer. RS logging system is anticipated on entire unit. Yarding system difficulties due to: corridors planned and suspension required. Keep roads high and out of wetlands. Estimate volume alt 5: Estimated volume [17x20]+[9x20] Deleted acres due to uneconomic scrub. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Unit adjacent to existing Old Growth Reserves (HCA). 0 marten acres habitat in harvest unit. See BMPs listed above.



Cholmondeley DEIS Unit 616-008



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|---------------------------|--|---|---|---------------------------|------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | 300-Ft Offset From Stream | AHWU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | Planned New Specified Road Construction | AHWU 4 Stream | 40-Ft Canals |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Temporary Road Construction | Log Transfer Facility | Proposed Landing |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Streams | Eagle Nest | |
| State & Private Land | | | AHWU 2 Stream | | |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-008 ACRES: 36 VOL: 504 MBF ALTERNATIVES: 2,4,5

PHOTO YR#: '91/490-75,74 1/4 QUAD: ELEV. RANGE: 300-400 ASPECT: N LOGGING SYSTEMS: RS, SH

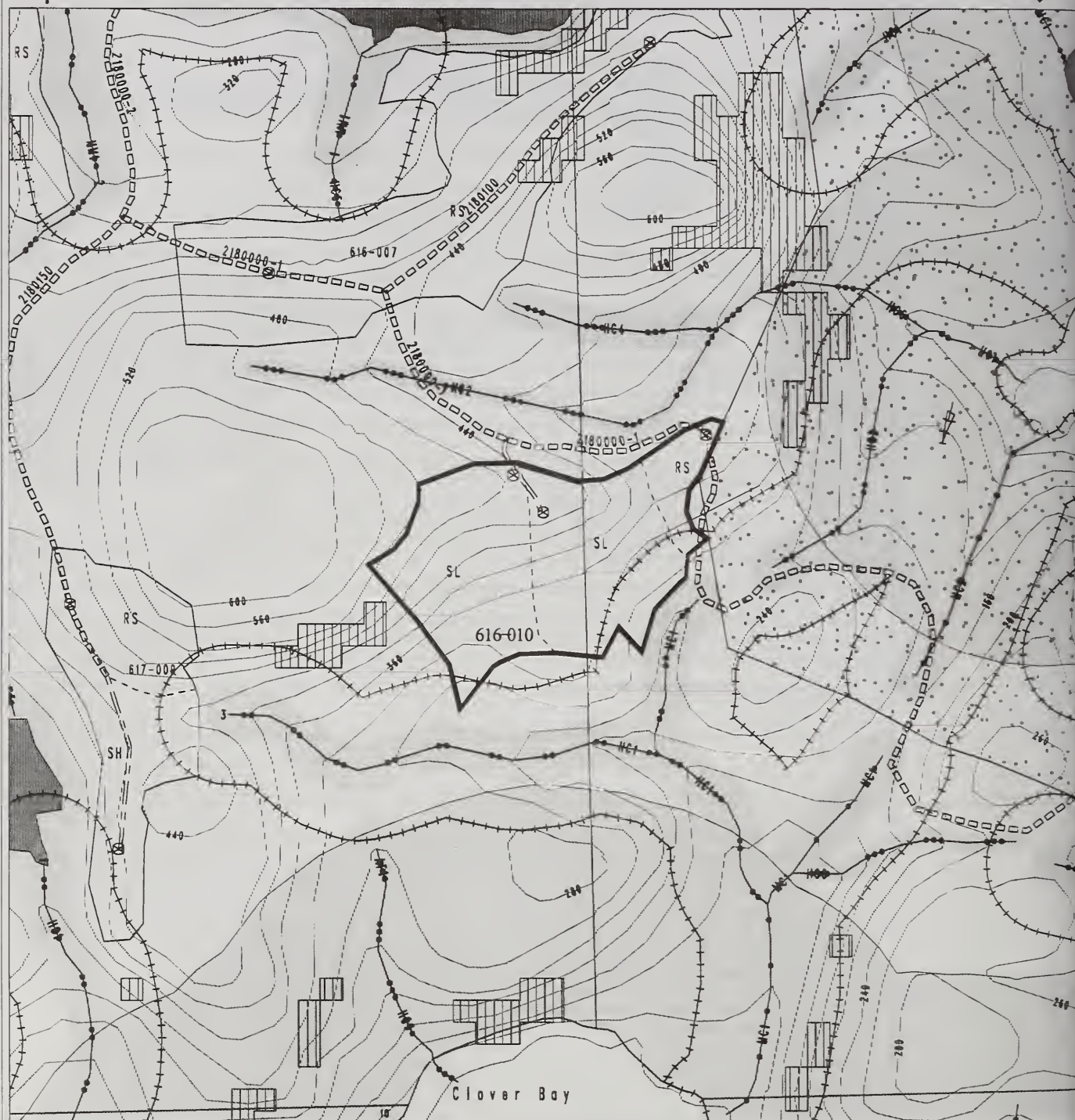
WATERSHED#: F33A NAME/CAT#: MONIE/102-50-28 ROAD#: 2180200 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W4, W7, W34, V1, V4,). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands= 20; Superstand Net Vol/ac= 16,416; Insects & Disease= Cedar Dieback= high; Rot= high; Downhill Yarding= 25%; Windthrow risk= medium to low; Logging System Options= Running Skyline, Helicopter, & Shovel; Regeneration System Options= Clearcut-typeB & CORR; Site Productivity= 3; Average Site Index (50yr)= 80.0 marten habitat acres.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 60 percent gradient with about 1 acre of slopes over 72 percent in unit 008. The steep slopes occur around a rock outcrop. Most of the unit classifies as forested wetland. Partial suspension is required to minimize landsliding and impacts to soils and wetlands (BMP 12.5, 13.5 and 13.9). The lake west of unit 008 has a narrow lakeshore riparian area that will be entirely included in the lake buffer (BMP 12.6 and 12.6a). See fisheries section for streamcourse and lake protection measures. (BMP 12.6a and 13.16).
P.Moore S.Farzan 6/9/97	FISHERIES Stream#1 Class <u>IIA/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC5</u> Class IIA portion: 120' no cut buffer. Class III portion: Slope break buffer. Stream#2 Class <u>IIA, III</u> Flagging <u>BW</u> C-type <u>MM1/HC6</u> Class IIA portion: 120' no cut buffer. Class III portion not walked following unit expansion--plan for slopebreak buffer. Stream#3 Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> Class IV portion: No buffer Stream#4 Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> Class IV portion: No buffer Stream#5 Class <u>IIA/IV</u> Flagging <u>BW/GW</u> C-type <u>HC1/HC5</u> Class IIA portion: 100' buffer. Class IV portion: No buffer. Lake#1. This lake borders the west portion of the unit. It is a Class IIA lake. This lake requires a 100' no cut and an additional 150' partial cut buffer.
L.Mosenthin D.Newell 6/10/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. The unit is poor goshawk habitat. Unit is a western hemlock/western red cedar/blueberry plant association with skunk cabbage and western hemlock/western red cedar/salal plant association. There is no high value marten habitat located in this unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Recreation use in the area is light.
G. Lawton 3/00	PRESCRIPTION: (partial cut buffer along stream and lake). <u>Two-aged management clear-cut w/ reserves tending toward 2-aged management meet spacing requirements of 2-aged mgmt on this approximately 6 acres.</u> Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: lake partial cut buffer for fish and wildlife protection. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. Lake buffer of 100' no cut, and 150' feet partial cut required. Rest of unit, 17 acres is even-aged with reserves, Use: type D shaped cut leaving unmerchantable stems retained in 50 to 100 feet of the border for the remainder of the unit. Leave phenotypically superior seed trees along boundary as seed source. No high volume strata exist in unit. RS logging system (s) is anticipated on most, (shovel may be used on several levels places in the center). . Move planned road location into the unit to avoid several crossings. Drop small piece across southwest stream. Estimate volume alt 5[30x 16 MBF]+[3x1/2x16MBF]=504. Deleted acres due to uneconomic scrub. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Partial suspension required for soil protection. Stay out of sensitive plants to the north. Future entry is possible to recover reserve trees. See BMPs listed above.



Cholmondeley DEIS Unit 616-010



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|---------------------------|--|---|---|-----------------------|
| Soilwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-010 ACRES: 22 VOL: 396 MBF ALTERNATIVES: 2,4,5

PHOTO YR#:'91/490-75,76 1/4 QUAD: ELEV. RANGE: 350-500 ASPECT: SE LOGGING SYSTEMS: RS, SH, SL

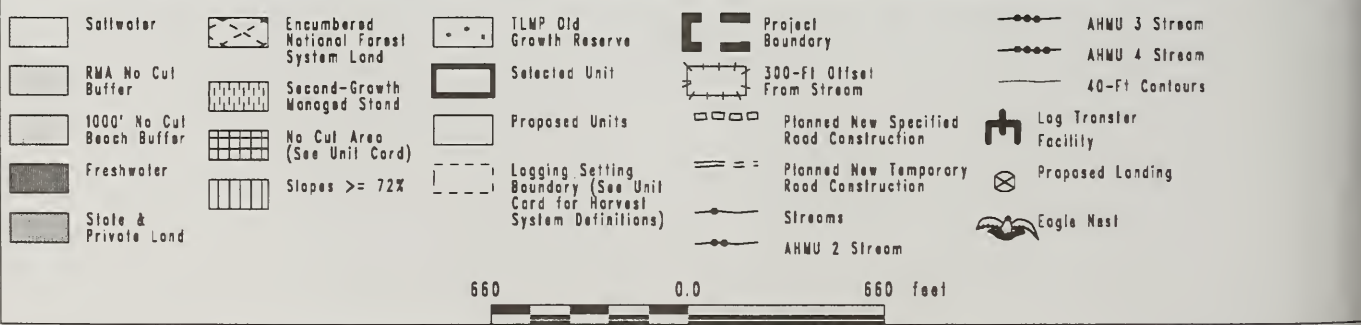
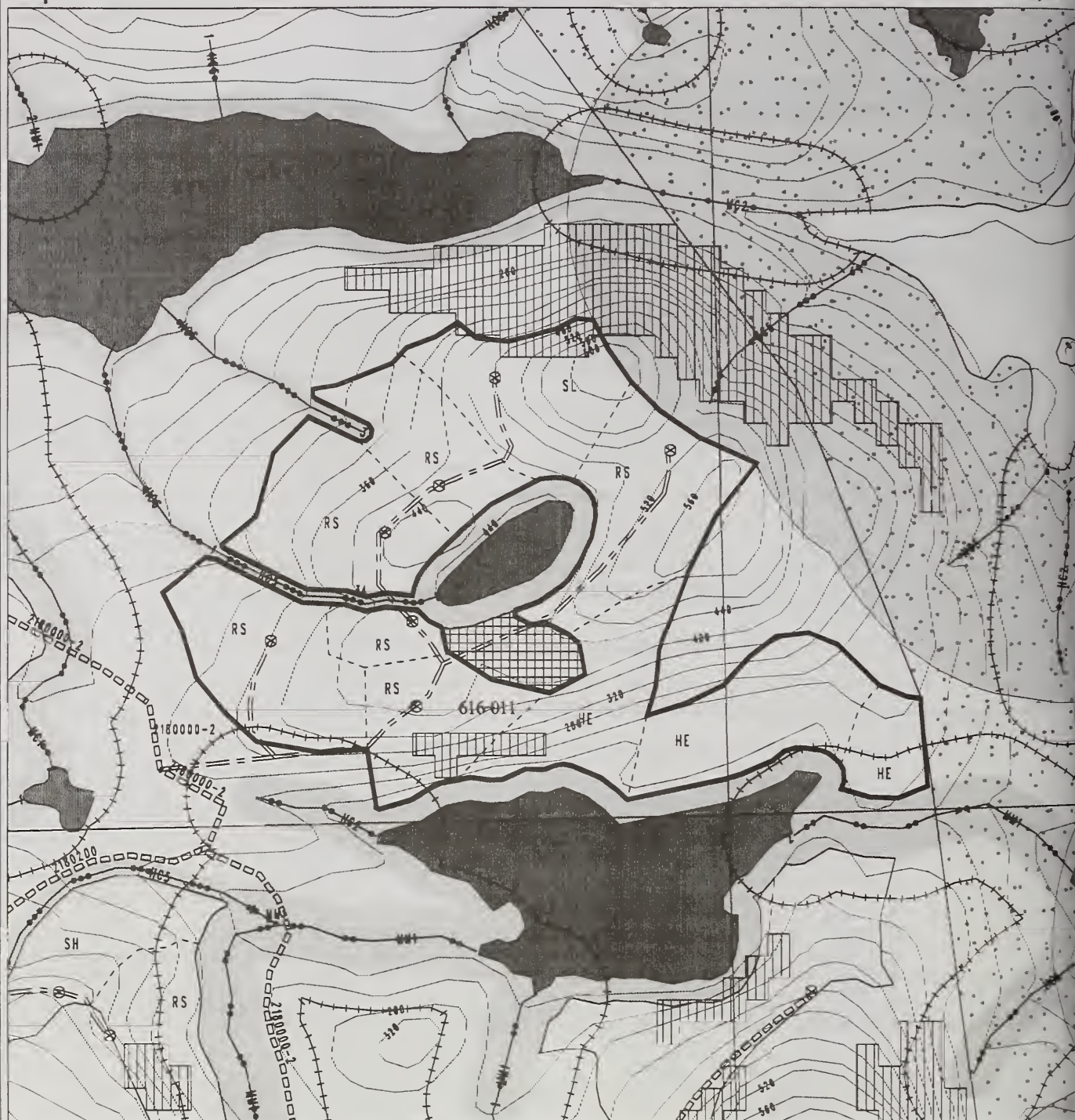
WATERSHED#: F40A NAME/CAT#: CLOVER LODGE ROAD#: 2180000-1 WINDTHROW RISK: Mod-High

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F21, T4, W1, W7, W34, V1, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands= 12; Superstand Net Vol/ac= 19,861; Insect & Disease: Cedar dieback- high, Mistletoe- high; Rot- high. Downhill Yarding= 25%; Windthrow risk- high; Logging Systems options- Running Skyline; Regeneration System Options- Clearcut-typeA; Site Productivity- 4; Average Site Index (50yr)- 80. 0 marten habitat acres.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 60 percent gradient. Landslide potential is moderate and high. Nearly the entire unit classifies as forested wetlands. Use partial suspension to minimize landslides and impacts to soil and wetland resources (BMPs 12.5, 13.5 and 13.9). A class 2 stream adjacent to the southwest corner of the unit has a small, weakly defined riparian area, that will be entirely within the buffer (BMP 12.6 and 12.6a). The stream is seasonally used as a domestic water supply by Clover Bay Lodge. See fisheries section for specific streamcourse protection measures (BMP 12.6a and 13.16).
J.Hannon	FISHERIES Unit not field reviewed by fisheries. GIS shows class IIA HC1 and MC1 channels along the south side of the unit. Plan for 100' TTRA buffers and review streams during layout. The stream flows into the north side of Clover Bay near the Clover Bay Lodge tie up location. The stream is used as a domestic water source when the lodge is tied up in Clover Bay. Maintain the 100' buffer to protect water quality. Provide a buffer to protect water quality in any new streams discovered in the unit. BMPs 12.6, 13.16
L.Mosenthin A.Moore 7/28/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar with salal plant association. Very steep slopes in places (125%) with large rock outcrops. Bald eagle came to goshawk call. Lots of snags in unit. There is no high value marten habitat in this unit. Retain 2.2 to 4.4 acres of cutting unit. This unit is near an old growth reserve.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. Only portion of backline visible from south shore of Clover Bay. RECREATION: Unit is located above Clover Bay.
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves; retain <15% of cutting unit overall, or <30CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type A clear-cut. Type A clear-cuts leave safe snags and non-merchantable reserve trees within a 50 to 100 foot border along harvest unit edges and non-merchantable trees near internal setting boundaries if safety is assured. In this case, trees are directionally felled toward the landing and carefully yarded out of the buffer. Uneconomical for any other type of regeneration system. No high volume strata exist in unit. Soils partial suspension is required on the NW corner. RS logging system is anticipated on all of unit, NW corner may require SL. Yarding system difficulties due to: downhill yarding w. suspension. May require spur to reach pieces depending on location of system road. High mistletoe infection rate, much rot and windthrow history along with uneconomic options all point toward CC regeneration method. Future activities: regeneration surveys. Unit near to 1,000' beach/estuary buffer. Unit adjacent to old growth reserves).</u> PROTECT POTENTIAL DOMESTIC WATER STREAM #1. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevent contamination from oil spills, and potential written agreements. (See other BMPs listed above. alt 5 (20MBF22)x.90=396. See BMPs listed above.



Cholmondeley DEIS Unit 616-011



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-011 ACRES: 78 VOL: 2180 MBF ALTERNATIVES: 2,4,5

PHOTO YR#: '91/490-75,74 1/4 QUAD: ELEV. RANGE: 200-400 ASPECT: ALL LOGGING SYSTEMS: RS,HE,SL

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-28 ROAD#: 2180210, 2180215 WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F15, F18, F21, T1, T4, W1, W7, W28, W34, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 10 & 23; Superstand Net Vol/ac.- 31,939; Insects & Disease: Cedar dieback- high & Mistletoe- high; Downhill Yarding= 50%; Windthrow risk= high; Logging System Options- Helicopter & Running Skyline; Regeneration Systems Options- Clearcut-typeD 1/2, & Overstory Removal; Site Productivity- 4; Average Site Index (50yr)= 75.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 10 to 90 percent gradient in unit 011 with approximately 3 acres of slopes over 72 percent gradient. Slopes greater than 72 percent gradient and cliffs up to 30 feet high are located in the southeast part of the unit. Unit 011 includes about 2 acres of forested wetlands just south of the pond mid-unit. Use a combination of partial and full suspension to minimize impacts to soil and wetland resources (BMP 12.5, 13.5 & 13.9). Full suspension is required around the cliff. The lake just south of unit 011 has a narrow lakeshore riparian area that will be entirely within the lake buffer (BMP 12.6 & 12.6a). See fisheries section for specific lake and pond protection requirements (BMPs 12.6a and 13.16).
P.Moore T.Paul 6/30/97 P.Moore S.Farzan 6/16/97	FISHERIES Lake#1: on southern unit boundary. Class II lake with cutthroat, dolly varden, and sticklebacks. 100' no cut and an additional 100' of partial cut buffer. Lake#2: small lake/pond in center of unit 30m X 100m. No fish found. Lake buffered for wildlife purposes. Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Slopebreak buffer recommended, drains from pond into Monie Lake. Stream# <u>2</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>MM1</u> 120' no cut buffer. BMPs 12.6, 13.16
L. Mosenthin A. Moore 7/22/97 M. Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Numerous snags in the unit. There are rock outcrops in the unit. Unit is a western hemlock/western red cedar/salal plant association. An area of muskeg has been deleted on the southeast corner of the lake. Waterfowl nesting and use of the area has been documented and as a result wildlife recommends a 100-foot no cut buffer on the lake in the middle of the unit. 2.4 acres of high value marten habitat retention are required in the western 1/3 of this unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: FS archaeologists surveyed this unit during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Present unit design would appear as obvious alterations to the landscape to the casual observer in the Monie Lake Basin. Recreation use in the area is light.
G. Lawton 3/00	PRESCRIPTION: Reserves for fisheries and marten mitigation. <u>Combination of even-aged clear-cut with reserves (type D) on the north, and two-aged Overstory Removal w/>24"dbh (cut > or = 24"dbh) at the south end of the unit: retain <15% of cutting unit overall, or <30CCF, where feasible and safe.</u> TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to the <u>western 1/3</u> of the unit. They require <u>2.4</u> acres of structural retention for high value marten habitat credited in: <u>1 acre in stream.</u> Additional acres will have to be achieved for retention. The leave area that is mapped to the south of the lake is not high value marten habitat. A no cut buffer could be left between the western road and the small northern lake. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. The needs calculate out to <u>180</u> live trees >20"dbh and <u>135</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. . Due to steepness and lake buffer needs at the southern lake, an <u>OSR w/24" dbh limit (cut everything above 24.0") is prescribed in the 100' partial-cut buffer above the 100' lake no-cut buffer.</u> Use helicopter on the suspension area and everything east of this . The road will <u>not</u> be built low across the unit (paralleling the lake). 75% of the volume will be removed in this area (``15 Ac). Estimate volume alt 5 .75[15MBFx 40]+[35MBFx30]+[31MBFx20]-[3MBFx20]=. Maintain setting width between units. Adjacent to existing old growth reserve. See BMPs listed above.



Cholmondeley DEIS Unit 616-012



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Sollwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RWA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHMU 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-012 ACRES: 58 VOL: 1662 alt 5 MBF ALTERNATIVES: 2,4,5

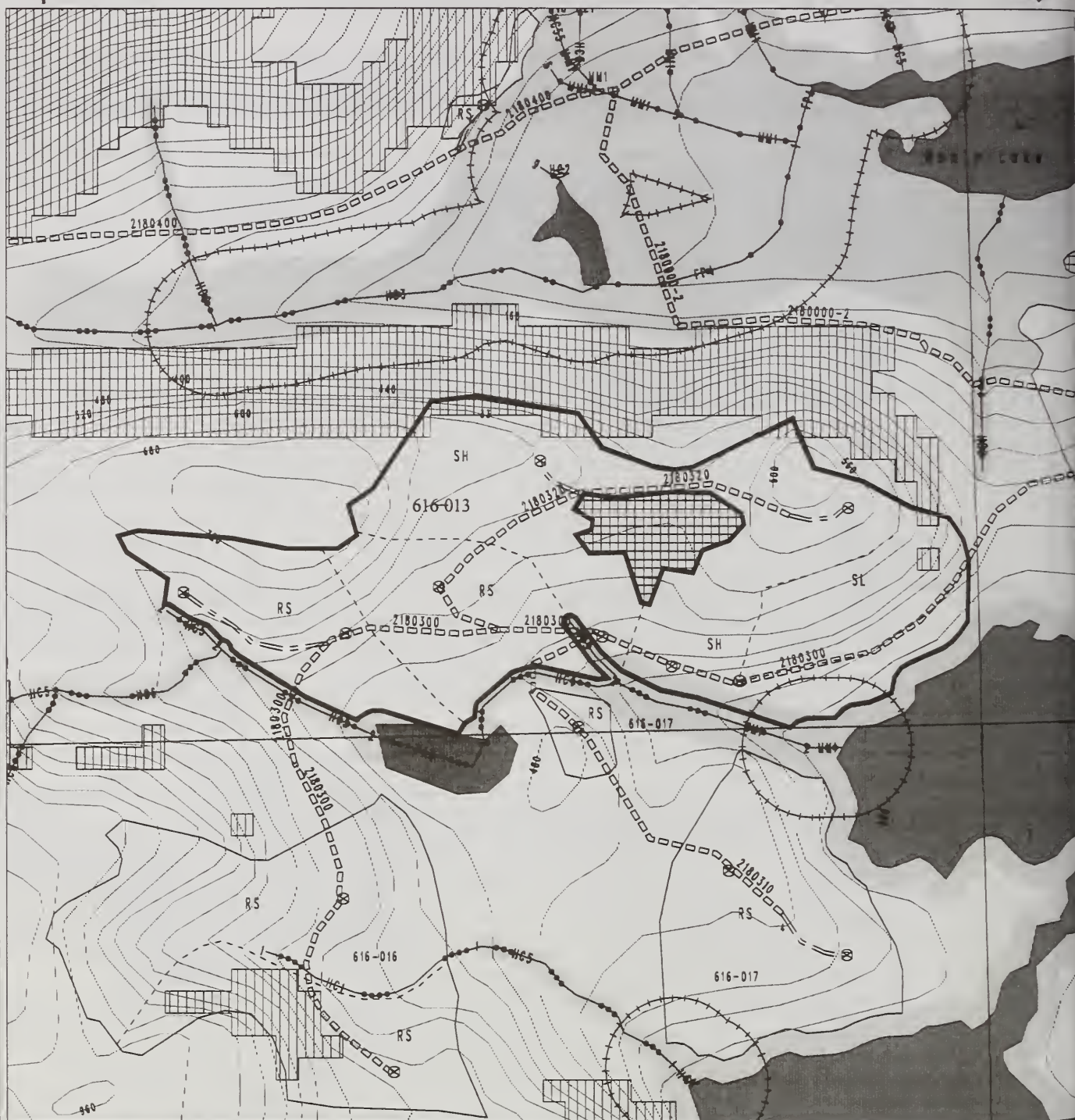
PHOTO YR#: '91/490-75,74 1/4 QUAD: ELEV. RANGE: 200-400 ASPECT: E LOGGING SYSTEMS: RS

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180000-2, 2180300 WINDTHROW RISK: High
 The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F6, F11, F18, F21, T4, W4, W7, W28, W31, W34, V4). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 22 & 23; Superstand Net Vol/ac.- 33,527; Insects & Disease: Cedar dieback- high & Mistletoe- high, & Rot-high; Downhill Yarding - 20%; Windthrow risk-high; Logging systems Options-Running Skyline and -helicopter; Regeneration System Options-Clearcut-type B & Corridor-; Site Productivity-4; Average Site Index (50yr)-80. Existing WT.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes in unit 012 range from 20 to 50 percent gradient. The east half of the unit is mostly forested wetland. Use partial suspension to minimize impacts to soil and wetland resources (BMP 12.5 and 13.9). The lakeshore riparian area on Monie Lake below the unit is narrow and entirely within the lake buffer. The stream east of the unit has an identifiable riparian area below the slope-break. The riparian area will be entirely within the stream buffer. The stream south of the unit has a short sedge fen riparian area. The unit boundary was modified following reconnaissance to avoid the riparian associated wetland fens north and south of the unit. The riparian area will be entirely within the buffer (BMPs 12.5, 12.6, 12.6a and 13.16). See fisheries section for specific streamcourse protection requirements.
S. Farzan P. Moore J. Hannon 5/30/97	FISHERIES <u>Monie Lake</u> : Class I lake--leave a 250' no cut buffer along the lake shore. Stream# <u>1</u> Class <u>I/II/A</u> Flagging <u>BW</u> C-type <u>MMI/MCI/PA</u> 200' buffer up to cascade falls (top of anadromous)then 120' buffer along MCI and PAI. Nothing for windfirmness because unit is on downwind side of stream. - Stream# <u>2</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> No buffer is required on this stream. Lake#2: on southern unit boundary. Class II lake with cutthroat, dolly varden, and sticklebacks. 100' no cut buffer and an additional 50' of partial cut buffer. <u>Lake#2</u> southwest of unit. Requires a 100' no cut and 50' of partial cut buffer. The road crossing will require timing for sockeye and coho (June 15-August 15) and possibly passage depending on final location. BMPs 12.6,13.16,14.6
L.Mosenthin A.Moore 7/22/97 M. Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar/blueberry/skunk cabbage plant association. Several sensitive plant species as well as other uncommon plant species were found in the medium-tall sedge dominated small bog wetland area located just to the southeast of the unit. The unit boundary has been moved to mitigate these plant populations. A population of <i>Senecio moresbiensis</i> was documented in this area. Other species found in this wetland include <i>Platanthera chorisiana</i> , <i>Botrychium multifidum</i> , <i>Lycopus uniflorus</i> as well as other aquatic and uncommon plant species. The retention area for marten must be located in the southern 2/3 of the unit (4.5 to 9.0 acres).
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS : -- LANDS : No concerns. CULTURAL : Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS No concerns. RECREATION : Unit is located in the lake basin south of Monie Lake. Present unit design would appear as obvious alterations to the landscape to the casual observer in the Monie Lake Basin. Recreation use in the area is light.
G.Lawton 3/00	PRESCRIPTION <u>Two-aged clearcut w/reserves</u> where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Criteria necessary for two-aged management: Reserve trees left in perpetuity creating a two structured stand. 1) <u>Retention</u> to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2). <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3). <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. Marten habitat described in TLMP requires 4.5 to 9.0 acres of structural retention for high value marten habitat in the southern 2/3rds of the unit. Structural acreage credit can be achieved through additional buffers above the minimum standards on the class I/II stream on the east side of the unit. The leave area mapped along the northern boundary of this unit is not high value marten habitat. Presale will need to layout an additional <u>1.5-5.0</u> acres of retention using blindleads, trees left in split-yarding areas, feathering of the backline (will help mitigate visual concerns), seed trees retained, wildlife islands where logging safety can be maintained. Clumps contain a minimum of 30% canopy closure. This could be achieved with a <u>~ 5 acre clump on the center knob</u> (least yarding impact). No-cut buffers along streams, lakes and marten habitat retention mitigates wildlife's request for structure retention. Maintain setting width between adjacent units. Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates out to <u>180</u> live trees >20"dbh and <u>135</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional individual trees will have to be marked or clumped to leave. Estimate volume [53x33MBF]x.95=1662. Deleted acres (Sedge Fen)NW and NE of unit. Protect sensitive plants to the SE of unit. Move southernmost spur upslope to avoid sensitive plants to the south. Future activities: regeneration surveys, yellow cedar planting, survival survey, seed collection, and pre-commercial thin @ 20-25 yrs. Partial suspension required for soil protection. Unit close to Old Growth Reserve. No RAW needed due to terrain. See BMPs listed above.



Cholmondeley DEIS Unit 616-013



- Saltwater
- RWA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes >= 72%

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-013 ACRES: 69 VOL: 1240 MBF ALTERNATIVES: 2,4,5

PHOTO YR#:'91/490-75,74 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT:ALL LOGGING SYSTEMS: SH, LS, SL

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180300, 2180310, 2180320, 2180330

WINDTHROW RISK: MODERATE

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F15, F18, F21, T4, W1, W4, W7, W34, V1, V4). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 49; Superstand Net Vol/ac= 23,513; Insects & Disease: Cedar Dieback- high, Mistletoe- high & Rot-high; Downhill Yarding- 25%; Windthrow risk- medium; Logging systems Options- Live Skyline & Shovel; Regeneration System Options- Clearcut-type B & Corridor-; Site Productivity- 4; Average Site Index (50yr)- 80. 0 marten ac.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 75 percent gradient in unit 013 with an estimated 2 acres of slopes over 72 percent gradient. Landslide potential is moderate and high. Most of the unit classifies as forested wetlands. Use partial suspension to minimize impacts to the soil and wetland resources (BMPs 12.5, 13.5 & 13.9). There is a narrow lakeshore and stream riparian area on the lake southeast of unit 013. A larger tall and short sedge fen riparian area occurs adjacent to the pond southwest of the unit. All riparian areas will be entirely within the stream and pond buffers (BMP 12.6, 12.6a and 13.16). See fisheries section for specific stream and lake protection measures (BMP 12.6a and 13.16).
P.Moore S.Farzan 6/11/97	FISHERIES Lake# <u>1</u> , on the eastern border of the unit. Class <u>II</u> supports dolly varden and cutthroat. A 100' no cut buffer and an additional 150' partial cut buffer. Stream# <u>2</u> Class <u>IIA, III</u> Flagging <u>BW, OW</u> C-type <u>MM1/HC5/PA2</u> A 120' no cut buffer with an additional 50' of partial cut for windfirmness along the class II portion. The class III HC5 portion requires a slopebreak buffer with additional trees left for windfirmness. The class III PA2 channel type area requires a 50' no cut buffer with additional trees for windfirmness. Stream# <u>3</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> A no cut slope break buffer with additional trees for windfirmness. BMPs 12.6, 13.16
L.Mosenthin A.Moore 6/11/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Abundant old and new beaver sign seen around lakes, a dam was present at the east end of the lake. Unit is a western hemlock/western red cedar/blueberry/salal plant association with. No high value marten habitat exists within the unit boundary. A palustrine area along the southern boundary has been protected with a buffer.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: FS archaeologist surveyed this unit during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Recreation use in the area is light
G.Lawton 3/00	PRESCRIPTION Reserves planned for wildlife corridor and fisheries needs. <u>Even-aged clear-cut w/ reserves (type D), small acreage of two-aged clear-cut w/reserves (cut/leave corridors).</u> Even-aged (65 acres) retain <u><15% of cutting unit overall</u> , or <u><30CCF</u> , where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type D clear-cut which calls for leaving safe snags and non-merchantable reserve trees within a 50 to 100 foot border along harvest unit edges and non-merchantable trees near internal setting boundaries if safety is assured. In this case, trees are directionally felled toward the landing and carefully yarded out of the buffer. 4 acres of 2-aged mgnt. Fingers of leave will consist of alternating cut/leave corridors. Use RS in this partial cut lake buffer below the planned road (takes 50% of the volume on 4 acres). Criteria necessary for two-aged management. Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> to be left standing is <u>>15 percent</u> of the volume or preferably <u>> 30 CCF</u> . Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be <u>< 2 tree heights</u> apart and any trees left in an opening must be <u>< 1 tree height</u> away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not <u>> 100'</u> apart. 3) <u>Size of opening</u> . The opening must be <u>< 2 tree heights</u> in width. Linear openings of slightly less are acceptable. Soils partial suspension is required on the steep SE face. No high volume strata exist in unit. Non-merchantable pole areas could be retained especially in shovel yarding areas. Yarding system difficulties due to: steep areas and scrub intermixed and group selection partial cut buffers, stream buffers, partial cut buffers and possible pole retention. Maintain setting width between adjacent units. Retain stand structure for wildlife where feasible. Use of a slackline machine and equipment on the lower road for lift could help achieve deflection for suspension in the steep SE corner. Estimate volume $\text{alt } 5 (20\text{MBF} \times 60) + (20\text{MBF} \times 4 \times .5) = 1240$. Deleted acres due to uneconomic scrub. Future activities: regeneration survey, harvest evaluation on non-clearcut portion, Yellow Cedar planting, seed collection, survival survey, and pre-commercial thin @ 20-25 yrs. See BMPs listed above.



Cholmondeley DEIS Unit 616-016



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- Slate & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHWU 2 Stream

- AHWU 3 Stream
- AHWU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-016 ACRES: 36 VOL: 648 MBF ALTERNATIVES: 2,4,5

PHOTO YR/#: '91/490-56,57 1/4 QUAD: ELEV. RANGE: 600-1000 ASPECT: E LOGGING SYSTEMS: RS

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180300, 2180340 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, T4, W1, W7, W34, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 49; Superstand Net Vol/ac= 21,519; Insects & Disease: YC decline in small amounts; Downhill Yarding- 80%; Windthrow risk- Low; Logging systems Options- Running Skyline; Regeneration System Options- partial cut option available due to low W.T. risk; Site Productivity- 4; Average Site Index (50yr) .
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 80 percent gradient with about 3 acres of slopes over 72 percent in the unit. Cliffs form part of the upper unit boundary . Landslide potential is moderate and high. Forested wetlands occur on about 6 acres in the eastern-most part of the unit and along the lower unit boundary. Use a minimum of partial suspension to minimize impact to soil and wetland resources and to protect the class 4 stream in the unit. (BMP 12.5 and 13.5 and 13.9). Locate the upper unit boundary below the cliffs and rock outcrops while still providing the necessary suspension (BMP 13.2). A tall and short sedge fen riparian area is located adjacent to the pond northeast of the unit. The entire riparian area is outside the unit. (BMPs 12.6 and 12.6a). See fisheries section for streamcourse protection measures (BMPs 12.6a and 13.16).
P.Moore S.Farzan 9/19/97	FISHERIES Stream# <u>1</u> Class <u>IIA/III/IV</u> FlaggingBW/OW/GW C-type <u>HC1</u> Class IIA portion: A 100' no cut buffer. Class III portion: A slope break slope break buffer with an additional 50' of partial cut for windfirmness. Class IV portion: No buffer required. BMPs 12.6,13.16
L.Mosenthin A.Moore 6/19/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a mixed conifer/blueberry/deer cabbage plant association. No high value marten habitat within unit boundary. A palustrine area is outside of the unit to the northeast, see unit 616-013. There is no high value marten habitat in this unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Recreation use in the area is light.
G.Lawton 3/00	PRESCRIPTION Reserves planned for wildlife needs. <u>Even-aged clear-cut w/ reserves(type B):</u> retain <15% or <30 CCF of the stand, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type B clear-cut which calls for a specified number of snags and live (8-10 trees/AC) replacements with >16" diameter limit retained in 50 to 100 feet of the border. Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is call for. Leave cedar seed trees where possible. Soils partial suspension is required on all of unit. No high volume strata or marten habitat exists in unit. Shovel logging system is anticipated only where soil scientist concurs (wetland plant association). Generally small diameter trees. Minimize roadbuilding. Estimate volume[36x20MBF]-10%. Deleted acres-N/A. Future activities: regeneration surveys, plant red cedar, seed collection survival survey, precommercial thinning @ 25+ yrs. See BMPs listed above.



Cholmondeley DEIS Unit 616-017



- Sollwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Lagging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHWU 2 Stream

- AHWU 3 Stream
- AHWU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-017 ACRES: 24 VOL: 228 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-75,74 1/4 QUAD: ELEV. RANGE: 300-400 ASPECT: E LOGGING SYSTEMS: SH, RS

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180310 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F21, T4, W6, W7, W28, W34, V6). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 49; Superstand Net Vol/ac= 19,614; Insects & Disease: Cedar Dieback- high, & Rot- high; Downhill Yarding- 0%; Windthrow risk- low; Logging systems Options- Live Skyline and Shovel; Regeneration System Options- Clearcut-typeB & Corridor" Patch cuts; Site Productivity- 4; Average Site Index (50yr)- 80; Variable std of clumpy high volume trees with poles spaced in between.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS
D.Landwehr 2/00	SOILS/WATERSHED Slopes in unit 017 range from 20 to 60 percent gradient. Landslide potential is moderate and high. Most of the unit classifies as forested wetland. Use partial suspension to minimize impacts to soil and wetland resources (BMPs 12.5 and 13.9). The lakeshore riparian area is narrow and will be entirely included in the lake buffer (BMP 12.6 and 12.6a). See fisheries section for streamcourse protection measures (BMP 12.6a and 13.16).
P.Moore S.Farzan 6/10/97	FISHERIES Lake# <u>1</u> , eastern boundary of the unit. Class <u>IIA</u> supporting fish. A 100' no-cut buffer and an additional 150' partial-cut buffer. Stream# <u>1</u> Class <u>IIA/III</u> Flagging <u>BW/OW</u> C-type <u>HC1/HC5</u> Class IIA portion: A 100' no-cut buffer. Class III portion: Slope-break no-cut buffer. Stream# <u>2</u> Class <u>IIA/III</u> Flagging <u>BW/OW</u> C-type <u>MM1</u> Class IIA portion: A 120' no-cut buffer. Class III portion: 50' no-cut buffer. BMPs 12.6, 13.16
L.Mosenthin A.Moore 6/17/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Large rock cliffs along the west side of the lower lake. Unit is poor goshawk habitat. Unit is a western hemlock/Alaska yellow cedar with salal plant association. There is no high value marten habitat within the unit boundary.
T. Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: FS archaeologists surveyed this unit during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin south of Monie Lake. Recreation use in the area is light. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION: Uneven-aged management system with group selection. Soils partial suspension is required on the steep NE & flat wet area in the west. Shovel yarding will require soil scientist input due to wet soils. No high volume strata exist in unit. Maintain setting width between adjacent units. Retain stand structure for wildlife where feasible. Fish is requesting 100' no cut buffer, & 150' partial cut buffer along the lakes. Unit is flat on top with short steep slope pitches into the partial cut zones. The volume is very clumpy with clumps of high volume patches separated by poles sized trees. <u>Group selections</u> of 1-2 acres centered on the high volume clumps could be mostly yarded with a <u>shovel</u> on the flats & possibly reach over the edges to retrieve high volume trees. Remove 50% of the unit volume through these group selections. The group selections could be in strips to facilitate easier yarding. Do not remove > 50% of the acres in the partial cuts. Estimate volume [24x19MBF]-50% = 228 Future activities: regeneration surveys, harvest evaluation on non-clearcut portion, Yellow & Red Cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Group selection covers RAW needs. See BMPs listed above.



Cholmondeley DEIS Unit 616-018



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Sallwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHW 3 Stream |
| RMA No Cul Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Oilseal From Stream | AHW 4 Stream |
| 1000' No Cul Beach Buffer | No Cul Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHW 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-018 ACRES: 30 VOL: 395.2 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/490-74 1/4 QUAD: ELEV. RANGE: 100-200 ASPECT: SW LOGGING SYSTEMS: RS,SH

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180500, 218010 WINDTHROW RISK: Low
 The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F21, W1, W7, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 51; Superstand Net Vol/ac= 12,666; Insects & Disease: some Cedar Dieback; Downhill Yarding- N/A; Windthrow risk- low; Logging systems Options- Running Skyline and Shovel; Regeneration System Options- ATC, CC; Site Productivity- 4; Average Site Index (50yr)- 80.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 20 to 50 percent gradient in unit 018. Unit 0189 was modified following reconnaissance to avoid wetlands, cliffs, and streams (BMPs 12.5 & 13.2). Nearly the entire unit classifies as forested wetland. Use partial suspension to minimize impacts to wetlands (BMP 12.5 and 13.9). Landslide potential is moderate. There is a narrow to non-existent lakeshore riparian area on the lake north of the unit. The entire riparian area will be within the buffer (BMP 12.6, 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMPs 12.6a and 13.16).
T.Paul J.Hannon 6/11/97	FISHERIES <u>Monie Lake</u> : south of unit, 250' buffer, unit is over 300' away <u>Lake north of Monie Lake (northeast side of unit)</u> : class IIA lake, recommend 150' buffer, cutthroat and dolly varden present in watershed. <u>Stream# 1</u> Class IV Flagging GW C-type <u>HCS</u> top of stream flagged at 180' elevation, no buffer. BMPs 12.6, 13.16
L.Mosenthin A.Moore 8/5/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar/blueberry/salal/skunk cabbage plant association. The population is located in a small wetland inclusion. It is recommended that during unit layout the small wetland area be excluded and for it to count towards the 5% retention of the unit. The unit has no high value marten habitat. This unit is next to an old growth reserve.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin north of Monie Lake. Present unit design would appear as obvious alterations to the landscape to the casual observer in the Monie Lake Basin. Recreation use in the area is light
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves(type A)</u> : retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: A type clear-cut which leaves safe snags and non-merchantable reserve trees within a 50 to 100 foot border along harvest unit edges and non-merchantable trees near internal setting boundaries if safety is assured. In this case, trees are directionally felled toward the landing and carefully yarded out of the buffer. No high volume strata exist in unit. <u>Very low volume and small diameter trees</u> which may prove to be uneconomical upon further investigation during layout. Need soil scientist input for shovel yarding on the forested wetland soils if proposed in the layout process. Feather upper boundary edge for mitigating visual impacts. Estimate volume (32x12 MBF- 5%). Deleted acres due to uneconomic scrub. Future activities: regeneration surveys, plant red cedar, seed collection, survival survey, and PCT @ 25 yrs. Partial suspension required for soil protection. Unit adjacent to Old Growth Reserves (HCA). No martin habitat in unit. See BMPs listed above.



Cholmondeley DEIS Unit 616-019



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Sallwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beech Butler | No Cut Area (See Unit Cord) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| Slope & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-019 ACRES: 17 VOL: 142.5 MBF ALTERNATIVES: 2,3,5

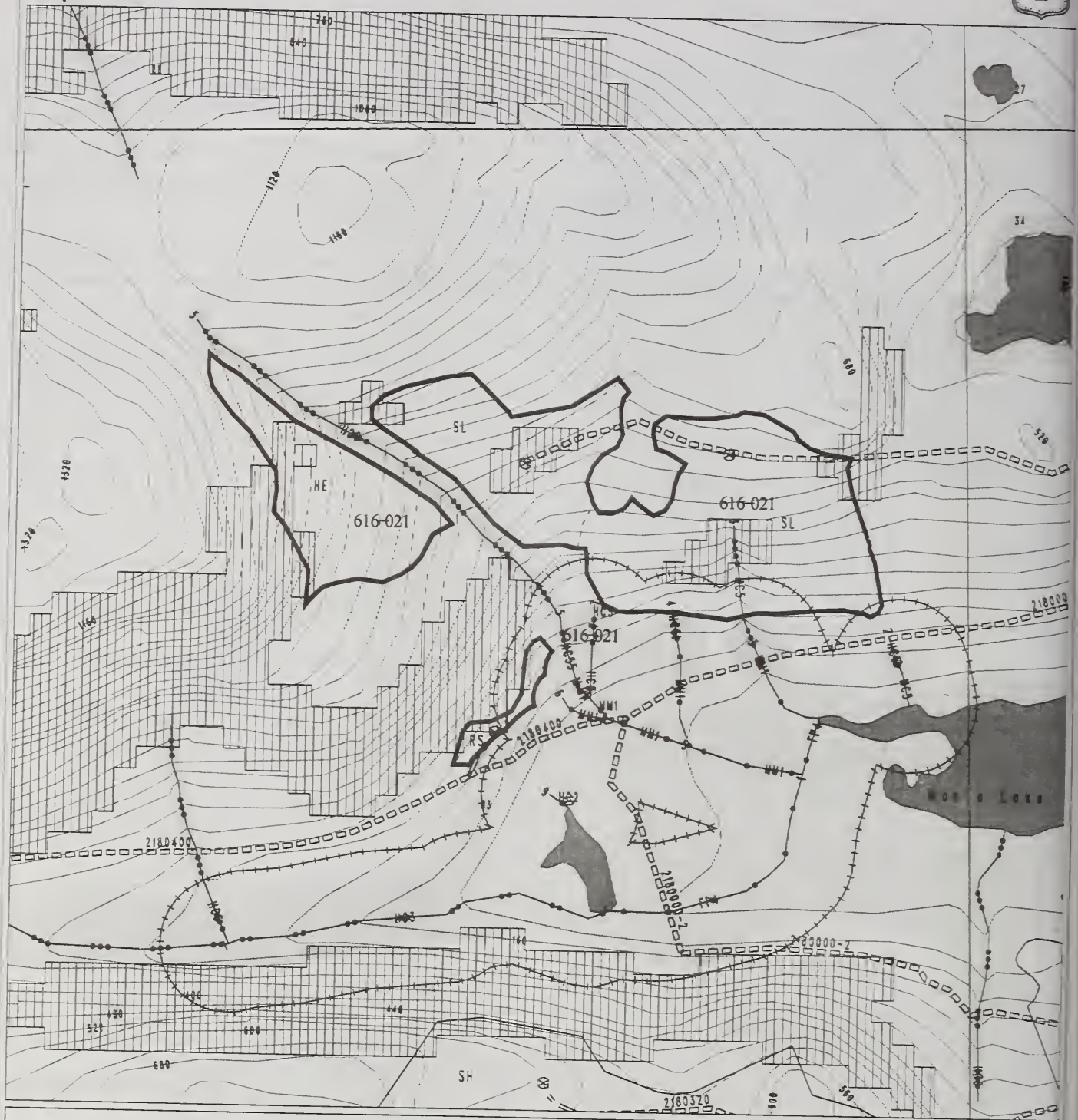
PHOTO YR#: '91/490-74 1/4 QUAD: ELEV. RANGE: 200-300 ASPECT: SE LOGGING SYSTEMS: RS,HEL

WATERSHED#: F33A NAME/CAT#: MONIE/102-50-27 ROAD#: 2180000-3, 2180600 WINDTHROW RISK: High
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F15, F18, F21, W1, W7, W34, V1, V4). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 34 & 52; Superstand Net Vol/ac= 7,768; Insects & Disease: N/A; Downhill Yarding- 75%; Windthrow risk- medium - high; Logging systems Options- Running Skyline, Slackline/helicopter; Regeneration System Options- CC-B, CORR downhill; Site Productivity- 5; Average Site Index (50yr)-60.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 20 to 90 percent gradient with an estimated 1 acres of slopes over 72 percent in unit 019. Unit 019 was modified following reconnaissance to avoid cliffs, unstable terrain and low volume areas (BMPs 13.2, 13.5, and 12.5). There is an existing landslide in the south end of the unit. Forested wetlands occupy about 10 acres of the unit. Deep well drained colluvial soils occur at the base of the cliff that splits the unit. Use a minimum of partial suspension on slopes less than 72 percent gradient to minimize impacts to soil and wetland resources (BMP 12.5 and 13. 9). There is a slope-break riparian area on the water quality stream southeast of the unit. The riparian area will be entirely within the buffer (BMP 12.6, 12.6a and 13.16). See fisheries section for streamcourse protection measures.
T.Paul J.Hannon 6/11/97	FISHERIES Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC6</u> Slopebreak buffer required and recommend an additional 50' partial cut buffer for windfirmness of the stream buffer. Stream flows into Monie Lake. Northeast side of unit not checked by fisheries. Timing for sockeye and coho will be needed for road crossing on stream #1. BMPs 12.6, 13.16, 14.6
M.Dillman 3/31/98 & 4/99	WILDLIFE Wildlife did not visit this unit. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. High value marten habitat needs to be retained < 1 acre, along the northern edge of the portion of the unit which extends to the east. Credit can be taken for the area which is deleted for soils concerns.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin northwest of Monie Lake. Present unit design would appear as obvious alterations to the landscape to the casual observer in the Monie Lake Basin. Recreation use in the area is light.
G. Lawton 3/00	PRESCRIPTION Single entry too uneconomical to harvest reserves. Reserves for marten, soils and visual mitigation. <u>Even-aged clear-cut w/ reserves(type B)</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type B clear-cut which calls for a specified number of snags and live (8-10 trees/AC) replacements with >20" diameter limits retained in 50 to 100 feet of the border. Due to the flexibility of the interior setting boundaries, live reserve trees for interior settings may only be required wherever a stream buffer is called for. Retain seed trees on boundary where possible & use stream buffer as 5% retention. Soils partial suspension is required on the South end. Requires <u>0.4-1 acres of structural retention for high value marten habitat</u> . A small portion of the structural acreage credit can be achieved through: area of steep soils dropped as "no-cut". Retain stand structure for wildlife where feasible. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to <u>16</u> live trees >20"dbh and <u>12</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available, additional trees will have to be marked or clumped to leave..Steep soils are outside of unit to the north. 60% downhill yarding. Yarding system difficulties due to: slackline system used for downhill yarding. Estimate volume [15x8MBF]. Deleted acres due to uneconomic scrub. Future activities: regeneration surveys, plant red cedar, seed collection, survival survey, and precommercial thinning at 25+ years. See BMPs listed above.



Cholmondeley DEIS Unit 616-021



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHWU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHWU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Cord) | Proposed Units | Planned New Specific Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Lading |
| | | | AHWU 2 Stream | Ecgle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-021 ACRES: 41 VOL: 932 MBF ALTERNATIVES: 2,3, 5

PHOTO YR/#: '91/490-57,58 1/4 QUAD: ELEV.RANGE: 200-600 ASPECT: SE LOGGING SYSTEMS: HEL,SL,RS

WATERSHED#: F33A NAME/CAT#: Monie/102-50-27 ROAD#: 2180400, 2180600 WINDTHROW RISK: Medium

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F6, F11, F15, F18, F21, W1, W7, W34, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 21 & 32; Superstand Net Vol/ac= 21,277; Insects & Disease: Cedar Dieback- high; Downhill Yarding- N/A; Windthrow risk- medium-high; Logging systems Options- Running Skyline; Regeneration System Options- Clearcut-typeB & Corridors; moderate mistletoe; Site Productivity- 3; Average Site Index (50yr)- 70.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 90 percent gradient, with about 2 acres of slopes greater than 72 percent gradient. The steep slopes occur on the western side of the unit and are associated with well-drained colluvial soils over bedrock. Forested wetlands occur on about 4 acres along the north unit boundary. The unit boundary was modified to exclude the extremely steep cliffy, slope section and wetlands areas along the west unit boundary (BMPs 12.5,13.2 and 13.5). Use a combination of partial and full suspension to protect soil and wetland resources (BMP 12.5, 13.5, and 13.9). There are high value wetlands and fisheries resources downslope. Appendix A of Soils Resources Report documents the rationale for allowing timber harvest on slopes over 72 percent gradient. There is one water quality stream with a slope-break riparian area mid-unit (BMP 12.6). The riparian area is entirely within the stream buffer (BMP 12.6a and 13.16). See fisheries section for specific streamcourse protection measures (BMP 12.6a and 13.16).
S.Farzan P.Moore J.Hannon 6/3/97	FISHERIES Note: most of these streams were eliminated from the unit at the bottom. Stream# <u>1</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>FP4</u> Monie Creek--recommend 300' no-cut buffer from FP4 portion. Becomes class II at a barrier falls with an HC3 channel type. Stream# <u>2</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> no buffer needed, top at 240' elev. Class I below the unit. Stream# <u>3</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>MM1/HC5</u> 120' buffer on MM1, no buffer on class IV, top at 250'. Stream# <u>4</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>MM1/HC5</u> class I is below unit (120' buffer) , Pacific Yew at class I/IV break, top at 220'. No buffer on class IV Stream# <u>5</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>MM1/HC6/5</u> Class I portion requires 120' buffer, top of class I at 200' elev. The class III portion requires a slopebreak buffer and an additional 50' of partial cut beyond the slopebreak for windfirmness. Timing (coho and sockeye) will be needed for the road crossing on this stream. Passage may also be needed depending on final road location. Stream# <u>6</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>MM1</u> Requires 120' buffer, small branch off of # 5 for about 200'. Stream# <u>7</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>HC5</u> 100' buffer on class I and no buffer on class IV. Stream# <u>8</u> There is GW flagging at about 320' elevation on a channel, marked as #8. After walking it down determined it is a non-stream, but the flagging was not removed. Stream# <u>9</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>HC2</u> 100' buffer, small channel flowing into pond, two blind dolly varden 8" & 5". <u>Lake/pond #10</u> directly south of unit with dolly varden and coho habitat--200' no-cut buffer. BMPs 12.6, 13.16, 14.6
L.Mosenthin A.Moore 7/23/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Lots of snags throughout. Area to the east of the v-notch, (call station #1), is better goshawk habitat. Unit is plant associations western hemlock/western red cedar/blueberry and mixed conifer/blueberry/salal/deer cabbage. Pacific Yew trees were found near the southeast boundary of the unit (near the channel break between a Class III and a Class IV on stream #3). An osprey was sited along the upper end of Monie Lake. .5-1 acre of high value marten habitat needs be located directly east of stream #5, in the south western corner of the section of unit to the east of the stream the unit is split on.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUAL: No concerns. RECREATION: Unit is located in the lake basin north of Monie Lake. Present unit design would appear as obvious alterations to the landscape to the casual observer in the Monie Lake Basin. Recreation use in the area is light.

G. Lawton
3/00

PRESCRIPTION One entry planned. Reserves would be retained. Reserves for wildlife, marten (<1 acre needed) soils mitigation.

Even-aged clear-cut w/ reserves (type D): retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: D type clear-cut proposed due to moderate windthrow, mistletoe, and large trees. Helicopter may be required to get soils suspension on western 1/3 of unit. Type D clear-cut would provide clumps of reserve trees in islands or fingers within the unit. This type can be implemented where rock outcrops, cliffs, or blind leads make harvesting uneconomical or infeasible. In addition, clumps of reserve trees can be left in other areas if helicopter yarding or cable yarding with lateral yarding capability is the logging system to be employed. Requires 0.5 - 1 acres of high volume strata need to be retained for high value marten habitat. Should be located east of stream #5 at bottom of unit. Structural credit can be achieved through: deferred soil retention and the RAW buffer. 40% downhill yarding. Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) per acre and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates out to 20 live trees >20"dbh and 15 snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional individual trees will have to be marked or clumped to leave. Much of the unit has been deleted for steep soils and scrub timber and low vol.

A combination of full and partial suspension is required on the entire unit (specialist during layout). Retain Pacific yew where feasible. Estimate volume $(30 \times 25) + (11 \times 21) \times .95$. Yarding system difficulties due to: very steep terrain with benches on western half of unit. Anticipated helicopter on at least the western 1/3 of the unit, with skyline yarding the rest of the unit. However, benches & cliffs may force falldown of acres particularly on the west 1/2, use these as retention (blind leads) of 10-20% of the volume & for wildlife structural retention. Keep road up high & search for benches (2nd profile ran on east 1/2 of unit. Future activities: regeneration surveys and precommercial thinning at 20-25 years. Structure through addition of 50' RAW on stream #5. Protect Yew at bottom of unit, by leaving as reserve trees if operationally possible. See BMPs listed above.



Cholmondeley DEIS Unit 616-022



- Sollwater
- RMA No Cul Buffer
- 1000' No Cul Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cul Area (See Unit Card)
- Slaves >= 72%

- ILWP Old Growth Reserve
- Selected Unit
- Proposed Units
- Lagging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Oilset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-022 ACRES: 38 VOL: 684 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/490-73 1/4 QUAD: ELEV. RANGE: 200-800 ASPECT: E LOGGING SYSTEMS: LS, SL, RS

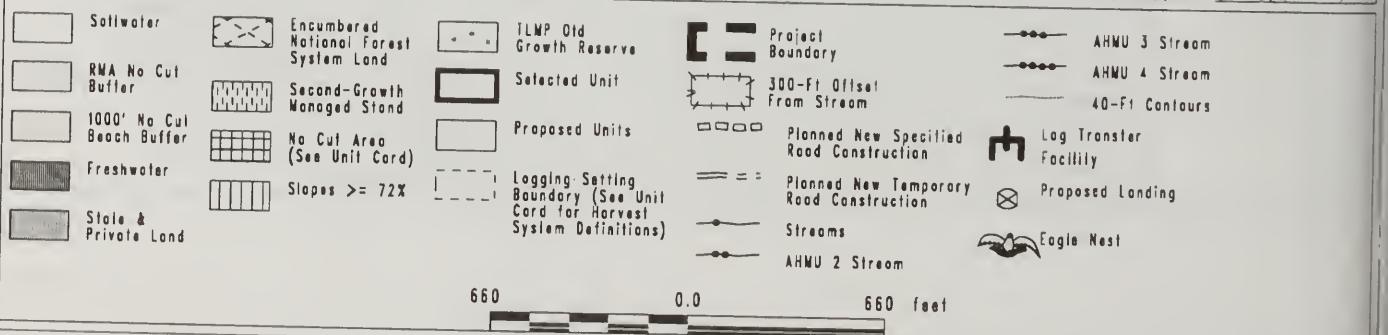
WATERSHED#: F34A NAME/CAT#: Wimpy Fish ROAD#: 2180000-3, 2180700 WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F18, F21, W1, W5, W7, W34, V1, V5, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 30, 38, 56, & 65; Superstand Net Vol/ac= 26,053; Insects & Disease: Cedar Dieback- high; Downhill Yarding- 12%; Windthrow risk- medium short trees; Logging systems Options- Live Skyline, slackline; Regeneration System Options- Group Selection & Clearcut-typeD; Site Productivity- 4/4; Average Site Index (50yr)- 80/70.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D. Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 85 percent in the unit. Short discontinuous pitches of slopes over 72 percent gradient are associated with small cliffs scattered throughout the upper half of the unit. Unit 022 was modified following reconnaissance to avoid cliffs and low volume areas (BMPs 13.2 and 13.5). Forested wetlands occupy about 15 acres on slopes less than 40 percent gradient. Use partial suspension to minimize landslides and impacts to soil and wetland resources. The stream along the south unit boundary has an identifiable riparian area below the slope-break. The pond and stream east of the unit have a wetland riparian area. Both riparian areas are included in the no-cut buffers (BMP 12.6, 12.6a and 13.16).
T. Paul J. Hannon 7/12&16/97	FISHERIES Stream# <u>1</u> Class <u>I/III</u> Flagging <u>BW/OW</u> C-type <u>PA5/FP3/HC6</u> 200' buffer along east side of unit in the FP3 and PA5 area, 150' buffer along south side of unit on class I portion, slopebreak buffer along stream on south side of unit where class I; class III portion requires a slopebreak buffer with an additional partial cut buffer of approximately one tree height beyond the slopebreak. Stream# <u>2</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5/MM1</u> A slopebreak buffer (or at least 25') is recommended for the stream including the MM1 portion with some partial cut for windfirmness (modification of S & G's). Stream# <u>3</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>MM1</u> 120' buffer required, 2 additional similar small channels are class I flagged BW to the south of #3. They all require 120' buffers. Stream# <u>4</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>MM1</u> 120' buffer, changes to nonstream below a 75' high cliff with 10' boulders below. Stream# <u>5</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> no buffer required, top of stream at 450' elevation. Stream# <u>6</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> no buffer required, top of stream at 600' and we flagged down to 500' elev.
A. Moore D. Newell 8/11/97 M. Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is a rock wall and unstable soils at the north end of the unit. Unit is a western hemlock/western red cedar/salal plant association. Unit requires 1.2-2.4 acres of structural retention for marten habitat. Structure must be left in the northern 1/3 of the unit.
T. Fifield 10/18/98 J. Short J. Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: Visual management objective for this middleground viewshed is maximum modification. Combined scale of Units 616-022, 023 and 123 is a bit too large to meet this objective. Recommend retaining some forested texture in a few parts of particularly units 616-022 and 023 to break up the overall scale of harvest in this area. RECREATION: Unit is located between Trollers Cove and Monie Lake. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION: One entry planned. Reserves would be retained for marten, visuals and soils mitigation. <u>Even-aged clear-cut w/ reserves (type D) above the road with cut/leave corridors beneath road;</u> retain 25% of cutting unit, where feasible and safe. Combination of full and partial suspension is required on the entire unit. Requires 3-5 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved through: <1.2 to 2.4 acres dropped due to soil steepness (if located in the northern 1/3), McGilvery content or other problems along eastern and northern boundary in high volume habitat near ponds. 20 % downhill yarding. Visual concerns partially addressed by dropped steep areas to the east and dropped steep low volume knob at center of unit. Mobile swing yarder could be used for the predominant small timber, however long reaches are required unless spurs are constructed. Type D clear-cut for downhill yarded portion above the midslope road and southern corner. Type D clear-cut would provide clumps of reserve trees in islands or fingers within the unit. This type can be implemented where rock outcrops, cliffs, or blind leads make harvesting uneconomical or infeasible. Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates out to <u>100</u> live trees >20" dbh and <u>75</u> snags >20" dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional individual trees will have to be marked or clumped to leave. <u>Below road alternating cut/leave corridors out from road. ~200' wide corridors with 200' wide leave strips. Retain 25% of the BA of the overall unit.</u> Corridors running directions other than straight East/West are best. Also for visuals, using the northern streams as splitlines while retaining some residuals will help mitigate visual impacts. Feather upper backline for visuals on the northern half of unit. Estimate volume (20 MBF x 27) .75 + (20 MBF x 10 Ac) = Deleted acres due to high MMI and uneconomic scrub. Future activities: regeneration surveys, Red & Yellow Cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Group selection takes care of RAW needs. See BMPs listed above.



Cholmondeley DEIS Unit 616-023



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-023 ACRES: 23 VOL: 248.4 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/490-73 1/4 QUAD: ELEV. RANGE: 200 ASPECT: SE LOGGING SYSTEMS: SL, LS

WATERSHED#: DD1A NAME/CAT#: CLIFFO ROAD#: 2180000-3, 2180000-4, 2180700 WINDTHROW RISK: medium

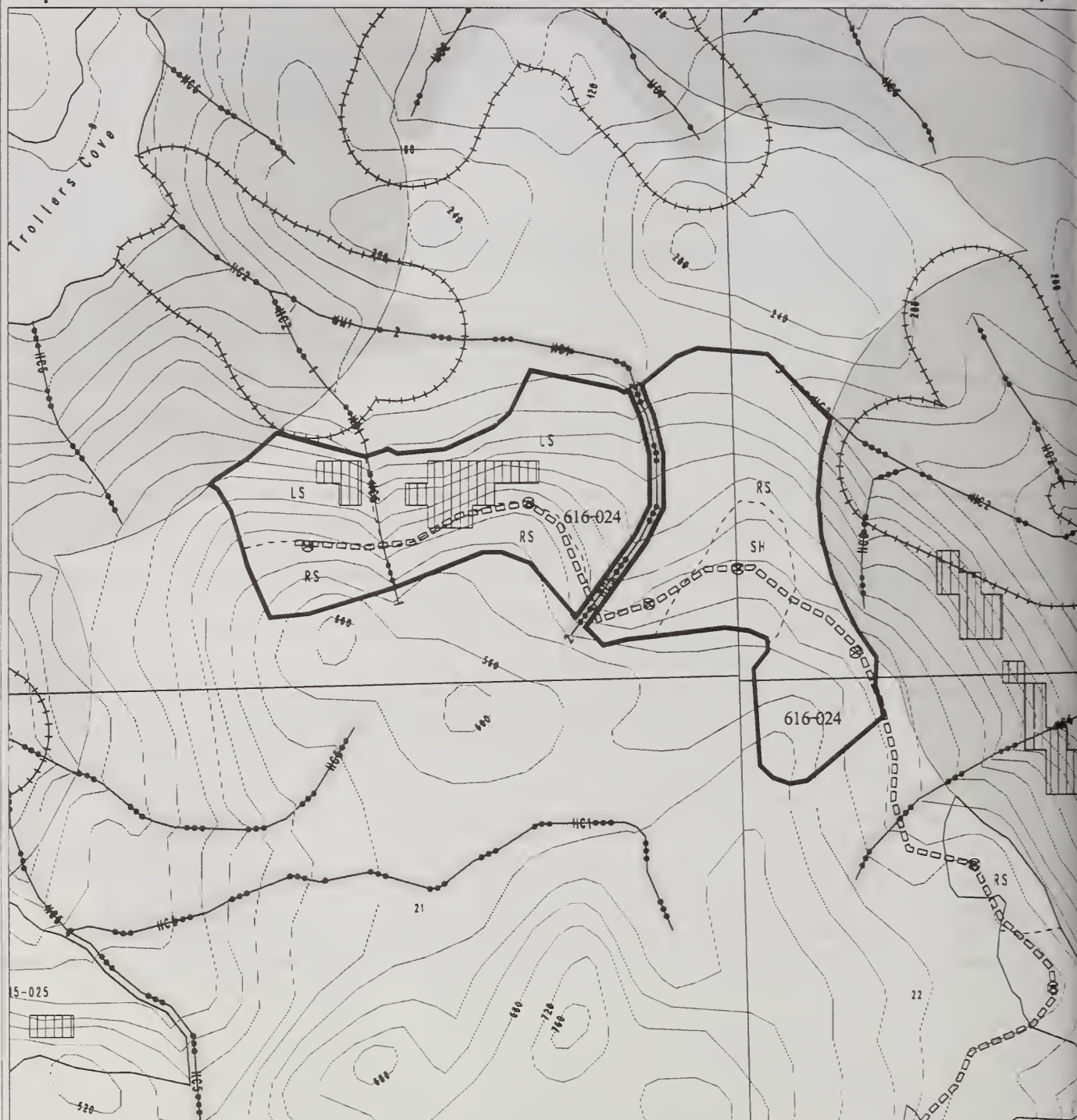
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W5, W7, W28, W34, V1, V5, V8, V13). These measures are described below within the resource sections that apply and correspond to

Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 65; Superstand Net Vol/ac= 11,591; Insects & Disease: Cedar Dieback- high; Downhill Yarding- 33%; Windthrow risk- medium-high, short trees; Logging systems Options- Running Skyline and Live Skyline; Regeneration System Options- Clearcut-type B; Site Productivity- 4; Average Site Index (50yr)- 80. Many snags.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 70 percent gradient, with about 2 acres of slopes over 72 percent gradient in unit 023. Landslide potential is moderate and high. Most of the unit classifies as forested wetland. Use partial suspension to minimize impacts to soil and wetland resources. (BMPs 12.5, 13.5, and 13.9) Two streams have identifiable riparian areas below the slope-break (BMP 12.6). The riparian areas are entirely within the buffers (BMP 12.6a and 13.16).
T.Paul J.Hannon 6/12/97	FISHERIES Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Keep unit boundary above slopebreak (south unit boundary). Stream# <u>2</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> Leave a slopebreak buffer. Stream probably becomes class IV through unit. This stream is mapped as class I in GIS below unit. Stream was not walked to saltwater below unit. North part of unit not checked for streams. BMPs 12.6, 13.16
A.Moore L.Mosenthin 7/17/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density It is poor goshawk habitat. Majority of the unit is plant association western hemlock/western red cedar/salal. Unit has no high value marten habitat.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See discussion under Unit 616-022. RECREATION: Unit is located between Trollers Cove and Monie Lake. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION One entry planned. Reserves would be retained for visuals and soils mitigation. <u>Even-aged clear-cut w/ reserves(type B) with cut/leave corridors beneath road at south end;</u> retain 25% of cutting unit, where feasible and safe. Soils partial suspension is required on the entire unit. Use: type B clear-cut which calls for a specified number of snags and live (8-10 trees/AC) replacements with >16" diameter limits retained in 50 to 100 feet of the border. Due to the flexibility of the interior setting boundaries, live reserve trees for interior settings may only be required wherever a stream buffer is called for. No high volume strata or marten habitat exists in unit. Already deferred areas will help to mitigate visuals concerns. RS may be a logging system option on the unit. Address visual concerns in area south and east side of unit by: running 150' wide corridors downslope, below the road, with intermittent retention areas between. <u>Retain ~25% of BA in the unit.</u> If not economical drop southern portion of the unit. If the midslope road exists then the addition to the south is reachable. Generally very low volume stand, only feasible if system road goes right through the unit. Estimate volume (12MBFx23)x .90. Deleted acres due to high MMI and uneconomic scrub. Future activities: regeneration surveys, harvest evaluation on non-clearcut portion, and pre-commercial thin @ 25+ yrs. Partial suspension required for soil protection. Unit adjacent to high strata timber which is in the existing Old Growth Reserve to the east. See BMPs listed above.



Cholmondeley DEIS Unit 616-024



- Soilwater
- RMA No Cul Buffer
- 1000' No Cul Beech Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cul Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging-Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHNU 2 Stream

- AHNU 3 Stream
- AHNU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

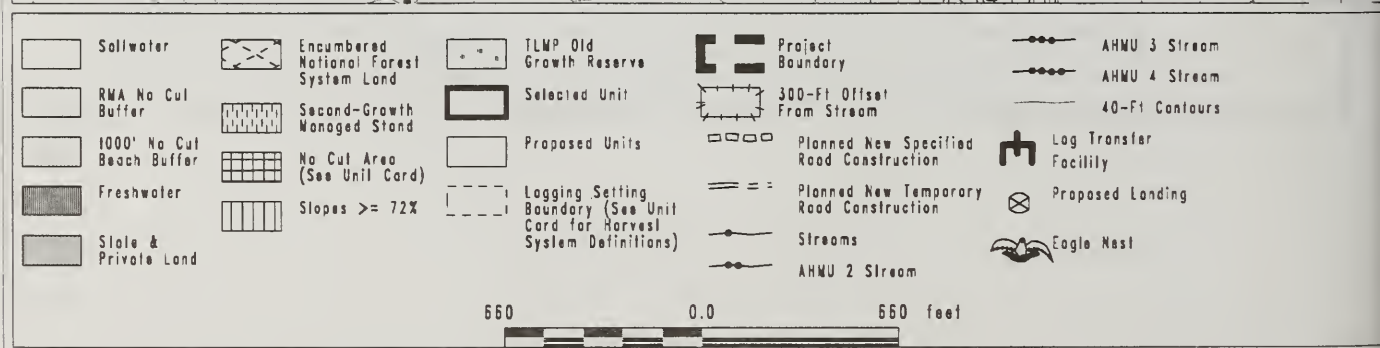
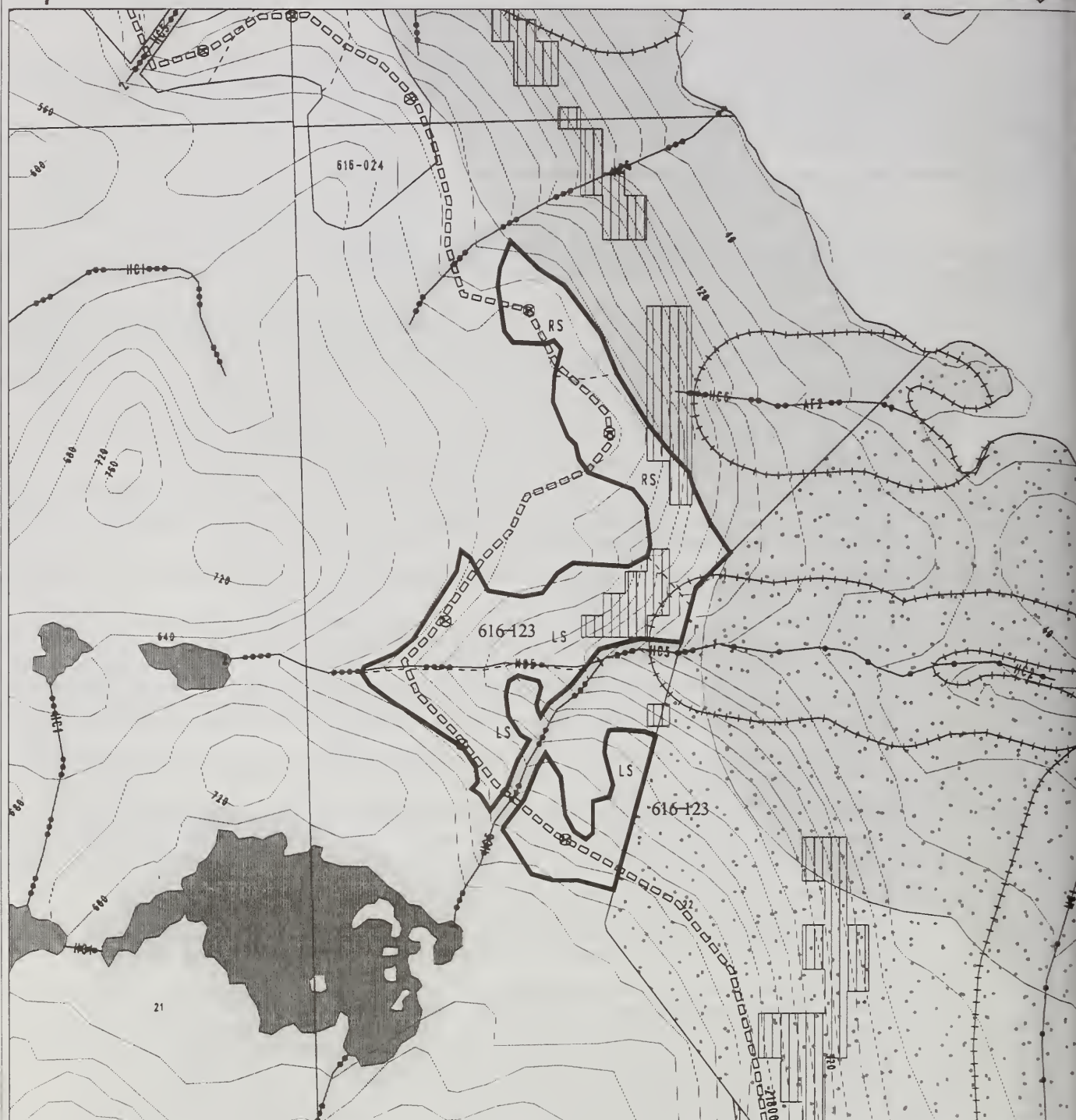
VCU-UNIT#: 616-024 ACRES: 55 VOL: 750 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/490-73,72 1/4 QUAD: ELEV. RANGE: 350-450 ASPECT: N LOGGING SYSTEMS: LS,SH,RS

WATERSHED#: DC10 NAME/CAT#: TROLLERS CABIN ROAD#: 2180000-4 WINDTHROW RISK: High

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W4, W7, W34, V1, V4, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands-73 & 74; Superstand Net Vol/ac= 19,877; Insects & Disease: Cedar Dieback- high; Downhill Yarding- 20%; Windthrow risk- High, but short trees; Logging systems Options- Live Skyline; Regeneration System Options- Corridor-Group Selection & Clearcut; Site Productivity- 5/4; Average Site Index (50yr)- 65/70.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 70 percent gradient, with about 3 acres of slopes over 72 percent gradient in unit 023. Landslide potential is moderate and high. Most of the unit classifies as forested wetland. Use partial suspension to minimize impacts to soil and wetland resources. (BMPs 12.5, 13.5, and 13.9) Two streams have identifiable riparian areas below the slope-break (BMP 12.6). The riparian areas are entirely within the buffers (BMP 12.6a and 13.16).
S.Farzan J.Hannon 7-16-97	FISHERIES Stream# <u>1</u> Class <u>IV</u> Flagging GW C-type <u>HCS</u> flagged from 440' to 300' elevation to where channel disappears, no buffer. Stream# <u>2</u> Class <u>III/IV</u> Flagging OW/GW C-type <u>HCS</u> , class III portion, slopebreak buffer. Changes to class IV at 240'. Class IV portion will not be buffered. North and east sides of unit were not thoroughly checked for streams, check and classify during layout. BMP 13.16
L.Mosenthin A.Moore 7/15/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Rock ledges in unit. No high value marten habitat in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Unit was surveyed during the 1997 field season. No cultural resources were located. No further concerns VISUALS: Visual management objective for most of the area in which this unit is located is maximum modification (middleground portion of viewshed). The western portion of unit is in the foreground viewed from the outer part of Trollers Cove. The foreground visual objective is modification. However, since this unit sits behind the Trollers Cove cabin, and is partially visible from the cove out in front of the Trollers Cove cabin, it is recommended that the impact of this harvest, particularly the sharp edge created by the backline, be somewhat minimized by retaining some forested texture in the western part of the unit. RECREATION: Unit is located above Trollers Cove Cabin (FS Cabin). See visuals section for design comments related to the recreation setting. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION Single entry planned. Reserves for visuals and wildlife retention strategy(connectivity). <u>Two-aged management clear-cut with reserves (~37 acres)</u> left in alternating cut/leave strips below the road and <u>even-aged clear-cut with reserves(type B ~18 acres)</u> above the road. Use: type B clear-cut above the road which calls for a specified number of snags and live (4 trees/AC) replacements with >16" diameter limits retained in 50 to 100 feet of the border. Due to the flexibility of the interior setting boundaries, live reserve trees for interior settings may only be required wherever a stream buffer is called for. No high volume strata exist in unit. Soils partial suspension is required on the lower 2/3 of unit. Forested wetlands on upper reaches need low impact disturbance(partial suspension). Visuals: already dropped parts of upper backline. Feather backline along the backline. Build road to minimum width standards for less visual impact. Retain a structural buffer on the interior streams for visuals. Criteria necessary for two-aged management <u>below the road</u> . Reserve trees left in perpetuity creating a two-structured stand. 1) <u>Retention</u> : to be left standing is >15 percent of the volume or preferably > 30 CCF. Reserve trees are left for other resource values: wildlife corridor needs, soil protection, or for the marten habitat. 2) <u>Distribution</u> . Reserve trees left in clumps must be < 2 tree heights apart and any trees left in an opening must be < 1 tree height away from a clump or edge of a unit (clumps are minimum of 100' across, this allows for 200' width cut corridors). Reserve trees left as individual trees need to be distributed throughout the entire unit not > 100' apart. 3) <u>Size of opening</u> . The opening must be < 2 tree heights in width. Linear openings of slightly less are acceptable. Cut the area <u>below the road</u> in a corridor or pie-shaped pattern to retain 50% BA. Keep widest of the opening of the corridors ~150' in width, alternate w/retention areas. Feather all boundaries. Stay off of steep McGilvery cliffs part of northern bdry. Mainly mobile swing yarder w/carrriage, some shovel. Estimate volume (20x20MBF)+(35x20MBF)x50%= Deleted acres due to high MMI and uneconomic scrub. Future activities: regeneration surveys, harvest evaluation on non-clearcut portion, and pre-commercial thin @ 25+ yrs. Unit adjacent to 1000' buffer to east and west. See BMPs listed above.



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-123 ACRES: 30 VOL: 501 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/490-72,73 1/4 QUAD: ELEV. RANGE: 300-400 ASPECT: E LOGGING SYSTEMS: RS, LS

WATERSHED#: DC9A/DC10 NAME/CAT#: Trollers cabin ROAD#: 2180000-4 WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F18, F21, W1, W7, W28, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 65, 68, & 73; Superstand Net Vol/ac= 19,409; Insects & Disease: moderate rot, cedar die back & mistletoe; Downhill Yarding- 5%; Windthrow risk- medium; Logging systems Options- Running Skyline, LS; Regeneration System Options- CC -type; Site Productivity- 4; Average Site Index (50yr)- 70.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 70 percent gradient in the unit. Unit 123 was modified following reconnaissance to avoid cliffs, steep slopes, wetlands and inoperable areas (BMP 12.5, 13.2, & 13.5). There is a 20 foot high cliff located mid unit. About half of the unit is forested wetlands. Thin (< 20 inches) organic soils cover the small rock knobs in the unit. Use full suspension over the cliffs and partial suspension in the rest of the unit to control soil displacements, landslide potential, and impacts to wetland resources (BMPS 12.5, 13.5, and 13.9). A slope-break riparian area occurs on one water quality stream mid unit (BMP 12.6). The riparian area is entirely within the no-cut buffer (BMP 12.6a). See fisheries section for specific streamcourse protection measures (BMPs 12.6a and 13.16).
P.Moore T.Paul 7/16/97	FISHERIES Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> recommend slopebreak buffer + 25' partial cut for windfirmness, coho and dolly varden below unit. Stream# <u>2</u> Class <u>IV</u> Flagging <u>not flagged in field due to questionable classification</u> C-type <u>HC5</u> no buffer required BMP 12.6, 13.16
M.Dillman 4/98 and 4/99	WILDLIFE Wildlife did not visit this unit due to information from other resources concerning the scrub timber. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. 1.2-2.4 acres be retained overall. The high value marten habitat needs to be located in the northern half of the second setting from the north or to the east of stream #1 after it enters the unit and then turns south. Maintain 1,000-foot beach/estuary buffer.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: Units north of Doctor Point-This area is Timber Production with a VQO of Maximum Modification. The overall scale of all the units, particularly 616-123, 023, and 022 is a little too large to meet the max. mod. VQO. I would recommend retaining a fair amount of structure in just a small portion of units 023 and 022 (see maps and plots)-possibly 50 to 75%. Or maybe just dropping off those portions of those units (north of drainage in 022 and south of another drainage in 023). RECREATION: Unit is located between Trollers Cove and Monie Lake. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION Single entry planned. Reserves for visuals, marten, and wildlife retention strategy(connectivity). <u>Even-aged clear-cut with reserves(type B) above the road.</u> Use: type B clear-cut which calls for a specified number of snags and live (8-10 trees/AC) replacements with >16" diameter limits retained in 50 to 100 feet of the border. Due to the flexibility of the interior setting boundaries, live reserve trees for interior settings may only be required wherever a stream buffer is called for. Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates out to <u>56</u> live trees >20"dbh and <u>42</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional individual trees will have to be marked or clumped to leave. Use NE running creek as split line and retention & windfirm buffer as residuals for marten & visual needs. Adjacent to 1,000' beach/estuary buffer to NE. Soils partial/full suspension is required see soils section. 2-3 acres of structural retention required for high value marten habitat. Structural acreage credit can be achieved through: retention along the stream or using blindleads, trees left in split-yarding areas, feathering of the backline (will help mitigate visual concerns), seed trees retained, wildlife islands where logging safety can be maintained. Clumps contain a minimum of 30% canopy closure. Yarding system difficulties due to: cliffs & rock outcrops and tail hold availability. Estimate volume (19MBFx31) - 15% = 501. Future activities: regeneration surveys, release, and precommercial thinning at 20 to 25 years. Volumes/acre are low and yarding over cliffs maybe difficult. See BMPs above.

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 616-275 ACRES: 71 VOL: 1917 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/490-57,58 1/4 QUAD: ELEV. RANGE: 200-1500 ASPECT: S LOGGING SYSTEMS: HE, SL

WATERSHED#: F33A NAME/CAT#: Monie/102-50-27 ROAD#: 2180400 WINDTHROW RISK: Moderate - High
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W7, W28, W34, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 43, 45, & 48; Superstand Net Vol/ac= 29,419; Insects & Disease: n/a Downhill Yarding- 90%; Windthrow risk- medium- high; Logging systems Options- Helicopter & Slackline; Regeneration System Options- CC-A and CC-C; Site Productivity- 4; Average Site Index (50yr)- 70.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 90 percent gradient with approximately 8 acres of slopes greater than 72 percent gradient. The unit boundary was modified after project reconnaissance to exclude cliffs, rock outcrops, and extremely steep slopes (BMP 13.2& 13.5). Use full suspension on slopes over 72 percent gradient east of stream 7 and partial suspension on lesser slopes to maintain soil productivity and wetland resources (BMP 12.5, 13.5, and 13.9). The break between the helicopter and cable log setting west of stream 7 should be determined by profile analysis and the break set where partial suspension can no longer be achieved. A small forested wetland/short sedge wetland complex forms the riparian area on Upper Monie Creek downslope of the unit. A small old landslide and colluvial deposit form another small riparian area. The remaining streams have small riparian areas that are un-mapable at a scale of 1:15,840 (BMP 12.6). See fisheries section for streamcourse protection measures.
S.Farzan T.Paul J.Hannon 7/14/97	FISHERIES Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>MM1/MC1/HCS</u> Southern unit boundary stream, 120' buffer along the MM1 channel, 100' along MC1 and then 75' buffer (approximate height of trees there) along the HCS to the top of the unit. Stream#s <u>2-8</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HCS</u> #2 flows into #1 at 570' elevation; #3 flows into #1 at 500' and top is at 500'; #4 intersects #1 at 440' and top is at 780'; #5 intersects #1 at 400' and top is at 670'; #6 flows into #5 and top is at 480'; #7 becomes HC2 by helispot, did not walk to top of stream; #8 top flagged at 950' and intersects with #7 at 400' elevation. Stream# <u>9</u> Class <u>III/IV</u> Flagging <u>OW/GW</u> C-type <u>HCS</u> leave a slopebreak buffer along the class III portion, top of class IV is at 550' elevation. Stream#s <u>10-14</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HCS</u> The top of #10 is at 780' elevation; top of #11 is at 420' and it flows into #4 at 400'; top of #12 is at 600'; we flagged to 550' but the top is not flagged and the stream may continue on up (might be east unit boundary on original unit map); flagged #14 to about 400', flows together w/#13. The area around streams 10-14 appeared fairly unstable and wet although the stream channels are not large, an old slide is at top of #12, probably better to delete eastern portion of unit and expand on the southwest towards stream #1. Fall and yard away from class IV streams if practical, otherwise use partial extension if yarding across, but avoid downhill yarding across the class IV streams. Leave non-commercial trees along all streams. BMPs 12.6, 13.16, 13.5
M.Dillman 4/1/98 and 4/99	WILDLIFE Wildlife did not visit this unit due to information from other resources concerning steep slopes. Rock cliffs were noted as well. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Retention in the unit should be between (.6-1.2) acres. High value marten habitat needs to be retained between streams # 7 and #8.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located in the lake basin west of Monie Lake. Portions of the unit may be visible from Monie Lake. Recreation use in the vicinity of the unit is not probable. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION Single entry planned. Reserves for soils needs and marten habitat needs. Even-aged clear-cut w/ reserves(type A): retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type A clear-cut which calls for leaving safe snags and nonmerchantable reserve trees within a 50 to 100 foot border along harvest unit edges and non-merchantable trees near internal setting boundaries if safety is assured. In this case, trees are directionally felled toward the landing and carefully yarded out of the buffer. Soils requires full suspension on 22 acres of steep slopes >72% just east of stream #7. Requires 1-2 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved through: presale will need to layout additional acres of retention using blindleads, trees left in split-yarding areas, seed trees retained, wildlife islands where logging safety can be maintained. Clumps contain a minimum of 30% canopy closure. Buffer between streams 7&8 could be used for structure retention for marten (otherwise difficult to yard) or in steep acres dropped at upper corners of unit (these upper corners are not high value marten habitat). Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This calculates out to <u>28</u> live trees >20"dbh and <u>21</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional individual trees will have to be marked or clumped to leave. See profiles. Steep areas on top were dropped & wet areas on bottom were dropped. 90% downhill yarding. May be difficult to downhill yard with stream angles. Reach as high as possible with cable and helicopter the rest. Fisheries/and soils need to be present during layout/logging. Anticipate falldown of volume determined after profile analysis. Estimate volume (77x30MBF)-10%. Future activities: regeneration surveys and precommercial thinning at 20 to 25 years. Partial and full suspension required for soil protection. See soils above. See BMPs listed above.



Cholmondeley DEIS Unit 617-009



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Canlours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 617-009 ACRES: 15 VOL: 213.75 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-76,75 1/4 QUAD: ELEV. RANGE: 250,400 ASPECT: E-W LOGGING SYSTEMS: SH,RS

WATERSHED#: F33B NAME/CAT#: Clover West/102-50-23 ROAD#: 2180000-1, 2180000-2, 2180050

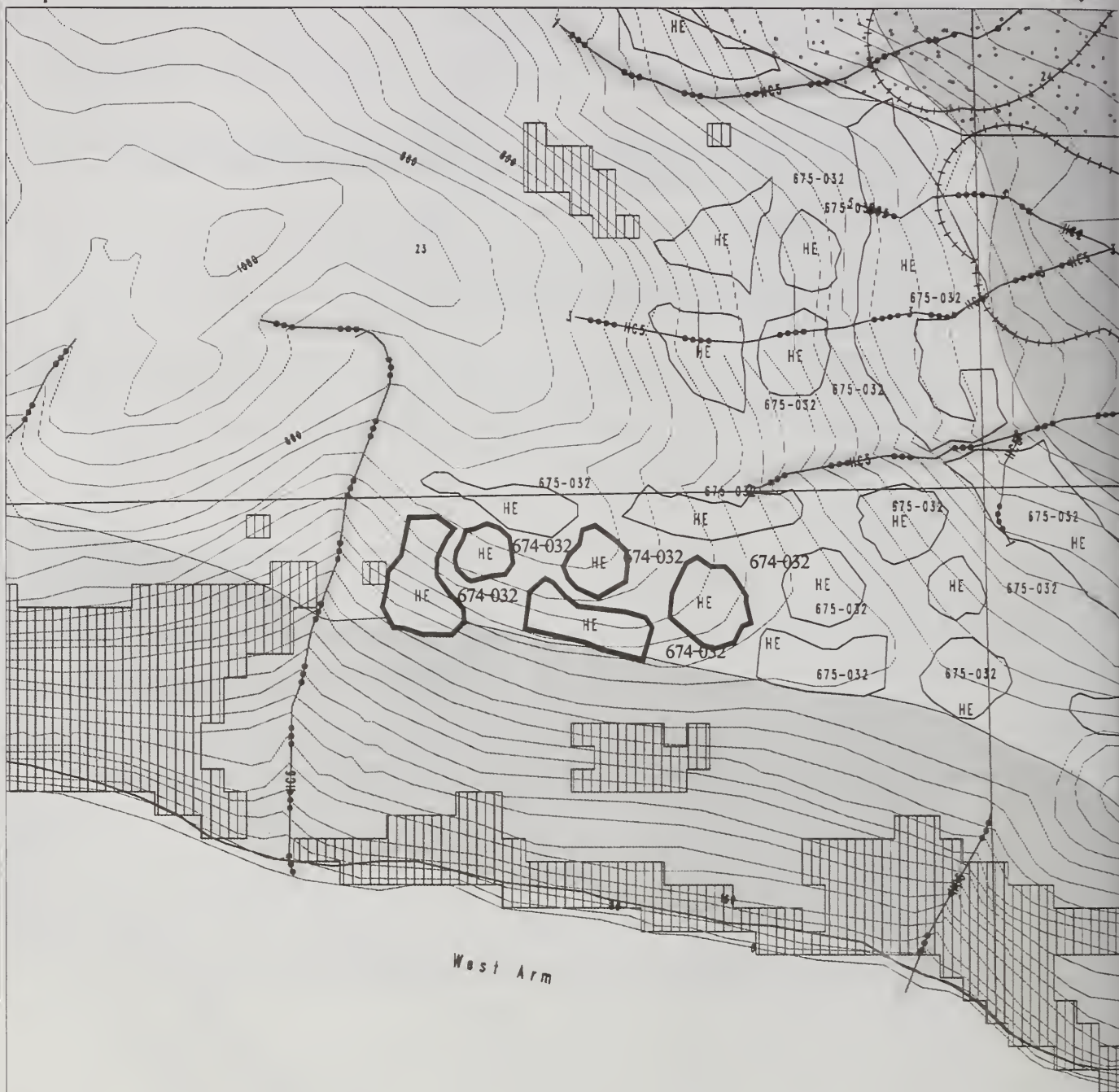
WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F21, T4, W1, W7, W20, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- N/A; Superstand Net Vol/ac= N/A; Insects & Disease: Cedar Dieback- high, Mistletoe- high & Rot- medium; Windthrow risk- medium-high; Logging systems Options- Shovel; Regeneration System Options- Clearcut-typeA & B; Site Productivity- 5; Average Site Index (50yr)- 65. Low volume.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 60 percent gradient in unit 009. Approximately 8 acres of the unit classify as forested wetland. Use partial suspension to maintain soil and wetland resources (BMP 12.5 & 13.9). There is a narrow lakeshore and stream riparian area that will be entirely within the no-cut buffers (BMPs 12.6 and 12.6a). See fisheries section for lake and streamcourse protection measures (BMP 13.16)
P.Moore T.Paul 7/1/97	FISHERIES Stream# <u>1</u> Class <u>I/IIA</u> Flagging <u>BW</u> C-type <u>HC1</u> A 100' TTRA buffer with some additional trees for windfirmness recommended. Dolly varden present along unit. <u>Lake #1</u> : Class <u>IIA</u> 100' TTRA buffer with some additional trees for windfirmness recommended (about 50'), dolly varden probably present. BMPs 12.6, 13.16
A.Moore D.Newell 6/17/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar/salal plant association There is no high value marten habitat in this unit. Maintain 100 foot no cut buffer on the lake.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. Very little if any of unit visible from Clover Bay. RECREATION: Unit is located above Clover Bay. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the Clover Bay area.
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves:</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type A clear-cut. Type A clear-cut leave safe snags and non-merchantable reserve trees within a 50 to 100 foot border along harvest unit edges and non-merchantable trees near internal setting boundaries if safety is assured. In this case, trees are directionally felled toward the landing and carefully yarded out of the buffer. No high volume strata or marten habitat exists in unit. Soils partial suspension is required on the NE 1/3 of the unit. Surrounded by scrub and unit is smaller then appears on map. Drop off southern spur and reach what is feasible by shovel. Cut unit short to the south to eliminate visual conflict at lodge in Clover Bay. Shovel logging system is anticipated on South & West, RS on NE (suspension required). Estimate volume [15 MBF x15]x.95=213.75. Deleted acres due to uneconomic scrub. Future activities: regeneration surveys, red cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Unit near 1000' beach buffer. See BMPs listed above.



Cholmondeley DEIS Unit 674-032



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours

- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-032 ACRES: 9 VOL: 450 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/590-20,19 1/4 QUAD: ELEV. RANGE: 600-800 ASPECT: S LOGGING SYSTEMS: HE

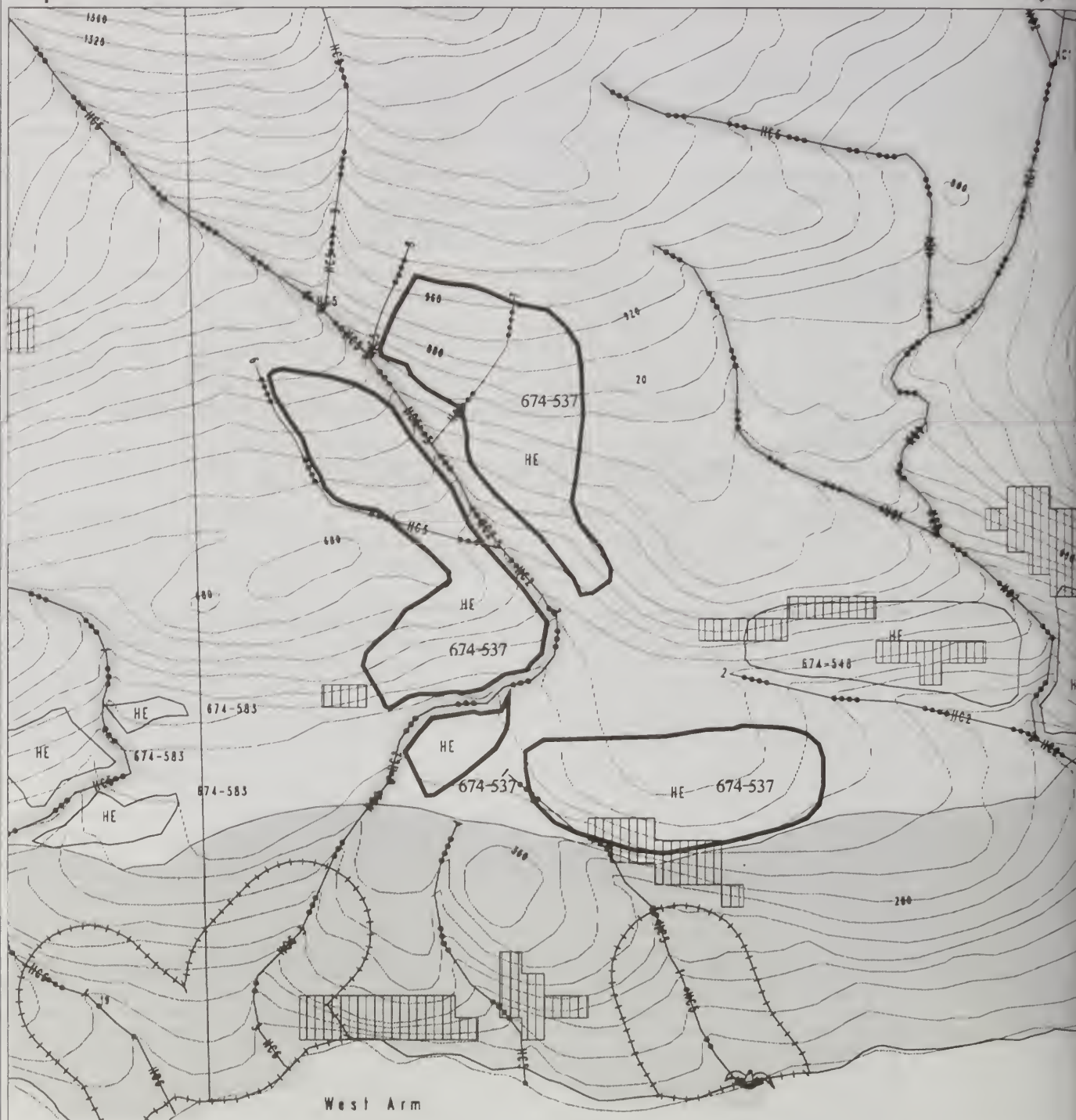
WATERSHED#: 000Z/ NAME/CAT#: ROAD#: None WINDTHROW RISK: HIGH

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, K1, K2, K, F1, F11, F18, F21, T4, W6, W7, W28, W34, V4, V6, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 50 & 53; Superstand Net Vol/ac= 62,045; Insects & Disease: Mistletoe- high & Rot- high; Downhill Yarding- 90%; Windthrow risk- high; Logging systems Options- Helicopter; Regeneration System Options- Overstory removal- 26", & Clearcut type-D; Site Productivity- 2-H; Average Site Index (50yr)- 100. Data show relatively wide spaced, large trees, mostly hemlock.
Jack Oien	TRANSPORTATION – NO CONCERNS
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 50 percent gradient. The unit is entirely underlain by karst. Use a minimum of partial suspension to protect soil and karst resources (BMP 13.9). Full suspension will be achieved via helicopter yarding. Design unit boundaries to prevent windthrow (BMP 13.2). Two slope-break riparian areas are present on Class 3 and 4 streams. Portions of the riparian areas are in no-cut buffers. Depending on the size of the reasonable assurance of windfirmness zone the entire riparian area may be in the buffers (BMP 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMP 13.16)
J.Hannon	FISHERIES Unit not field reviewed by fisheries. GIS shows three class III HC5 and HC6 channels within and adjacent to the unit. These may require slopebreak buffers. Plan for slopebreak buffers and evaluate stream classification and protection in unit during layout. One stream is mapped as class IIB below the unit. This is a low concern watershed for fisheries. BMPs 12.6, 13.16
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit surveyed by boat. The .9-1.8 acres of high value marten habitat can be retained anywhere in the unit except the SE ¼..
T.Fifield 10/18/98 J.Short	GEOLOGY/MINERALS: The southern 3 settings of the unit are predominately underlain by marble in which karst drainage systems have developed. Soils tend to be a mosaic of shallow organic and residual soils. Karst features (sinkholes) and steep cliffs were identified along the upper northwest unit boundary. If these are actually within the proposed unit boundaries, these should be deleted during final unit layout to meet TLMP Karst and Cave resource standards and guides and the loosing streams protected(these may be outside the harvest unit). Partial suspension is required throughout the unit. The proposed helicopter harvest in this unit will meet this requirement. The group selections proposed for this unit can be designed to protect karst features discovered during layout LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns.
J.Kluwe	VISUALS: The units along the West Arm are in a foreground zone. Hence they need to meet a partial retention objective. To meet this objective these units should generally consist of scattered clearcuts of from 5 to 15 acres that are for the most part located on the gentler slopes and on ridge tops or benches where they will blend into the topography. The steeper, more visible portion of these treatment areas should have enough forested texture remaining so that they appear similar to adjacent unharvested stands and so that any harvest activity is not easily discernable. Unit 674-032 sits on a ridgetop and is ok as proposed. No specific mitigation measures are required to meet scenic objectives. RECREATION: Unit is located west of Sunny Cove, opposite the community, and above and inventoried recreation site. See visuals section for design comments related to the recreation setting, as viewed from Sunny Cove.
G. Lawton 3/00	PRESCRIPTION: Could be multiple entries, however limited to expensive helicopter in the future. <u>Reserves to meet goals listed below. Uneven-aged group selections. Harvest 40-50% of the volume in small two-acre groups.</u> Requires 1-3 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved though: acres dropped due to Karst features and many acres retained between group selections. Soils partial suspension is required on most of unit. Karst features may require special yarding (see geologist), helicopter yarding will mitigate. Actually part of unit 675-032 Karst benches parallel contours, steep areas, McGilvery soils, high windthrow risk, partial retention for foreground zones, and high volume marten strata requiring retention all point to difficult downhill yarding decisions. There is also a pocket of dying trees near the saddle. <u>Goals would be to:</u> 1) Protect karst - options retention pockets and/or suspension of logs; 2) Guard against windthrow - option limit size of opening in the canopy to 1 -2 acres or individual tree marking throughout stand; 3) protection of steep & McGilvery soils - option to suspend logs; 4) limit visual impacts - option limit openings size or retain a portion of canopy; 5) protect structure in high value marten habitat on ~ 3 acres - option retain canopy structure in groups or retain 30% throughout cut; 6) salvage disease packet - option center cuts on this area. <u>Road stopped</u> east of Sunny Creek and helicopter these portions with 1-2 group selections, spread across the unit, centered on any dead/diseased tree packets, retention (non-cut areas) centered on the karst features, and steep McGilvery areas. Cut ~ 40-50% of the unit acreage in these cut pockets by this uneven-aged management strategy with intent for future harvest of the remaining volume. Protect residuals in this high volume stand by keeping the cut pockets small. Vol. est=(50mbfx18x.50) Deleted acres due to High MMI and Karst features. Partial suspension required for soil protection. Unit adjacent to 1000' buffer. Future activities: regeneration survey. Slope break covers RAW needs. See BMPs listed above.



Cholmondeley DEIS Unit 674-537



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cul Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cul Beech Buffer | No Cul Area (See Unit Cord) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHMU 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-537 ACRES: 44 VOL: 731 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/390-93,92 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT: S LOGGING SYSTEMS: HE

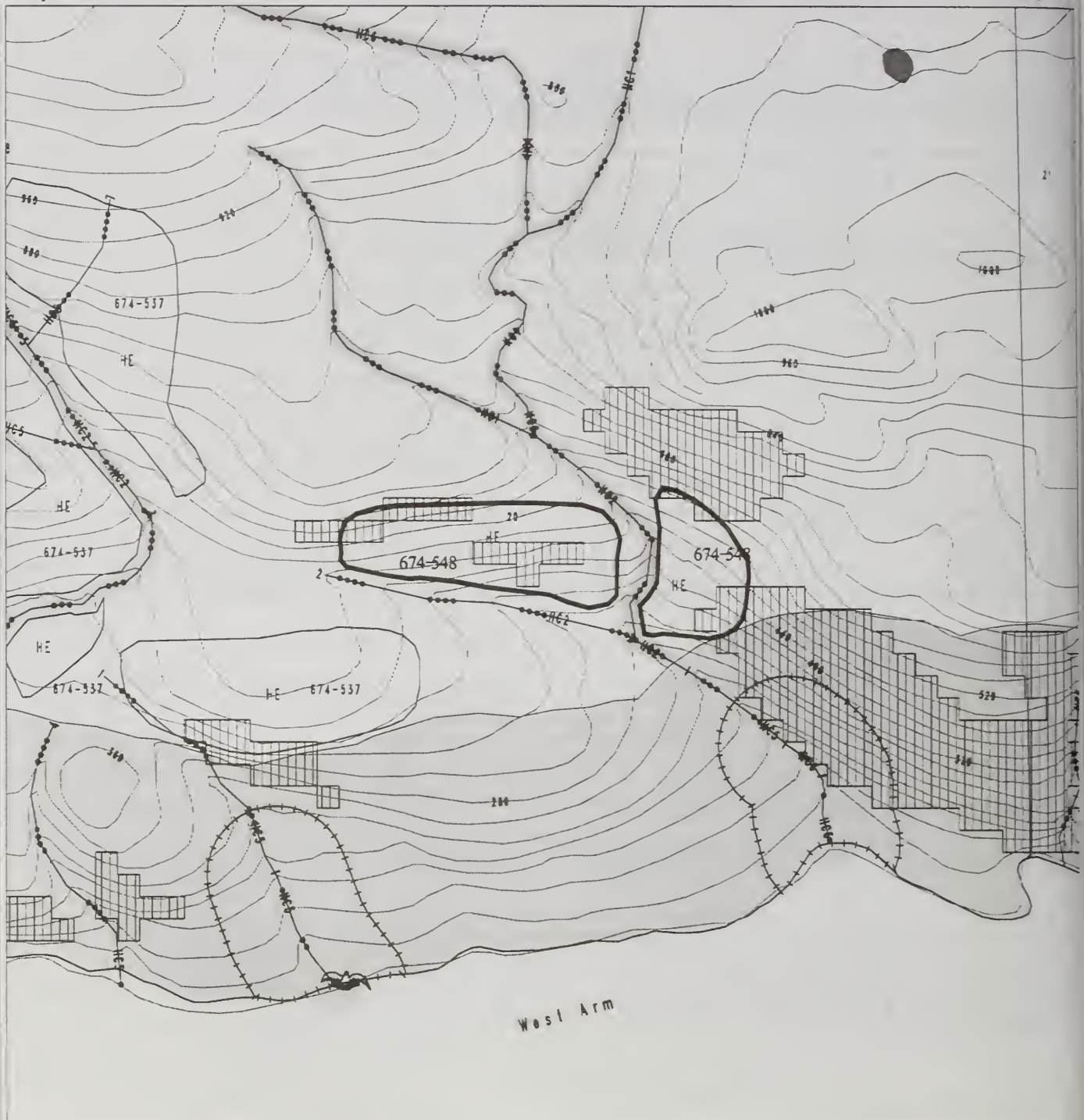
WATERSHED#: F25A NAME/CAT#: 2ND WEST ROAD#: None WINDTHROW RISK: M-L

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F21, W1, W7, W28, W34, V1, V6, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 32, 19, & 34; Superstand Net Vol/ac=12,705; Insects & Disease: Cedar dieback- high, Mistletoe- high & Rot- medium; Downhill Yarding- >50%; Windthrow risk- medium - low; Logging system Options- Helicopter; Regeneration System Options- Clearcut type-D & Even-Aged (relatively even diameter distribution); Site Productivity- 4-M;
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 20 to 60 percent gradient in unit 537.. Approximately 40 acres classify as forested wetlands. Use a minimum of partial suspension to protect soil and wetland resources (BMPs 12.5, 13.5, and 13.9). Full suspension is recommended via helicopter yarding. A riparian area occurs on one water quality stream below the slope-break (BMP 12.6). The riparian areas will be entirely within the no-cut buffers (BMP 12.6a). See fisheries section for specific streamcourse protection measures (BMPs 12.6a and 13.16).
J.Hannon	FISHERIES Stream checked only at saltwater (HC2), dolly varden present, flow too low for pinks. Dollys don't make it up near unit. Watershed is relatively low concern. A class III stream flows through the unit. Leave a slopebreak buffer on the class III. Three O/W class IV streams flow into the class III. Fall and yard away from the O/W class IV streams. Three G/W class IV streams are within and adjacent to the unit. No buffer required on the class IV streams. BMP 12.6, 13.16
A.Moore D.Newell 8/13/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. . Unit is a western hemlock/western red cedar/blueberry/salal plant association.. The high value marten habitat will need to be retained either in the southeast corner of the unit or north of the stream in the southwest corner of the unit. (1.1 acres).
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: The units along the West Arm are in a foreground zone. Hence they need to meet a partial retention objective. To meet this objective these units should generally consist of scattered clearcuts of from 5 to 15 acres that are for the most part located on the gentler slopes and on ridge tops or benches where they will blend into the topography. The steeper, more visible portion of these treatment areas should have enough forested texture remaining so that they appear similar to adjacent unharvested stands and so that any harvest activity is not easily discernable. RECREATION: Unit is in proximity to recreation sites in the West Arm of Cholmondeley Sound. See visuals section for design comments related to the recreation setting, as viewed from West Arm.
G. Lawton 3/00	PRESCRIPTION: Potential for future entries when visually less sensitive, however may be uneconomical. Reserves for visual, marten and soils needs. <u>Even-aged clear-cut with reserves(type C)</u> would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Soils partial suspension is required on the south and north ends. Helicopter logging system on entire unit. TLMP requires 1-2 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved through: acres of buffers on streams (western most stream only is high value marten habitat)and overstory removal residual. For visual and structural retention purposes: on the upper half of the unit place 100' buffer on stream #5. This will create a visual screen to meet VQOs. Upper boundary is also to be feathered. Estimate volume (15MBFx9x.7)+(20MBFx35x.9)=731. Future activities: regeneration surveys, release, and pre-commercial thin @ +25yrs. Partial suspension required for soil protection. Unit adjacent to 1,000' beach/estuary buffer. A reduction of acres in the layout phase will benefit visuals. See BMPs listed above.



Cholmondeley DEIS Unit 674-548



- | | | | | |
|----------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLWP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHMU 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-548 ACRES: 14 VOL: 260 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/390-93,92 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT: S LOGGING SYSTEMS: HE

WATERSHED#: F26A NAME/CAT#: 4th West ROAD#: None WINDTHROW RISK moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W7, W28, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- N/A; Superstand Net Vol/ac= N/A; Insects & Disease: Cedar dieback- high; Downhill Yarding- N/A; Windthrow risk- medium; Logging system Options- Helicopter; Regeneration System Options- Clearcut type-D & Even-Aged; Site Productivity- 4-M.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE.
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 75 percent gradient with an estimated 1 acres of slopes over 72 percent gradient. About 6 acres classify as forested wetland. Use a minimum of partial suspension to protect soil and wetland resources (BMPs 12.5 and 13.9). Two streams have identifiable riparian areas below the slope-break (BMP 12.6). The riparian areas will be entirely within the no-cut buffers. (BMP 12.6a). See fisheries section for specific streamcourse protection measures (BMP 13.16).
J.Hannon	FISHERIES Stream checked only near mouth. Pink salmon probably use the stream in the ITZ and to about 100' upstream, dolly varden probably present to about 300' upstream, stream fairly large (BFW ~ 9m). Low concern watershed for fisheries. Recommend moving the southern unit boundary to Class IV stream bank. Unit contains one class III and borders on a class IV stream. Buffer the class III with a slopebreak buffer. No buffer required on the class IV. BMP 12.6, 13.16
L.Mosenthin D.Newell 8/13/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat and snag density. The unit has scrubby timber and numerous snags. Since this unit is being helicopter logged it should be possible to leave standing structure within the unit boundary. The unit is a western hemlock/western red cedar/blueberry/salal plant association High value marten habitat will need to be retained in the southeast corner of the unit near streams #2 and #4 0.5-1.0 acre. Unit is adjacent to old growth reserve and 1000 beach buffer.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 674-537 discussion. RECREATION: Unit is in proximity to recreation sites in the West Arm of Cholmondeley Sound. See visuals section for design comments related to the recreation setting, as viewed from West Arm. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION Potential for future entries when visually less sensitive, however may be uneconomical. Reserves for visual, marten and soils needs. <u>Even-aged clear-cut with reserves (type C)</u> ; clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Helicopter logging system is anticipated on entire unit. TLMP requires up to 1 acre of structural retention for high value marten habitat. Structural acreage credit can be achieved through: presale efforts. This will visibly hide a portion of the unit behind it. From the backline into the unit 300', OSR trees >18" dbh, type C clear-cut the SE 1/2 of the unit, and from the 50' buffer to 300' from the backline. Estimate volume (15MBFx14. Future activities: regeneration surveys, harvest evaluation on non-clearcut portion, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Partial suspension required for soil protection. Unit adjacent to 1000' buffer. <u>In summary is a type C clearcut.</u> ANY reduction in size in the layout phase will benefit visuals. See BMPs listed above.



Cholmondeley DEIS Unit 674-549



West Arm

- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-549 ACRES: 28 VOL: 500 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/590-67.66 1/4 QUAD: ELEV. RANGE: 500-100 ASPECT: S LOGGING SYSTEMS: HE

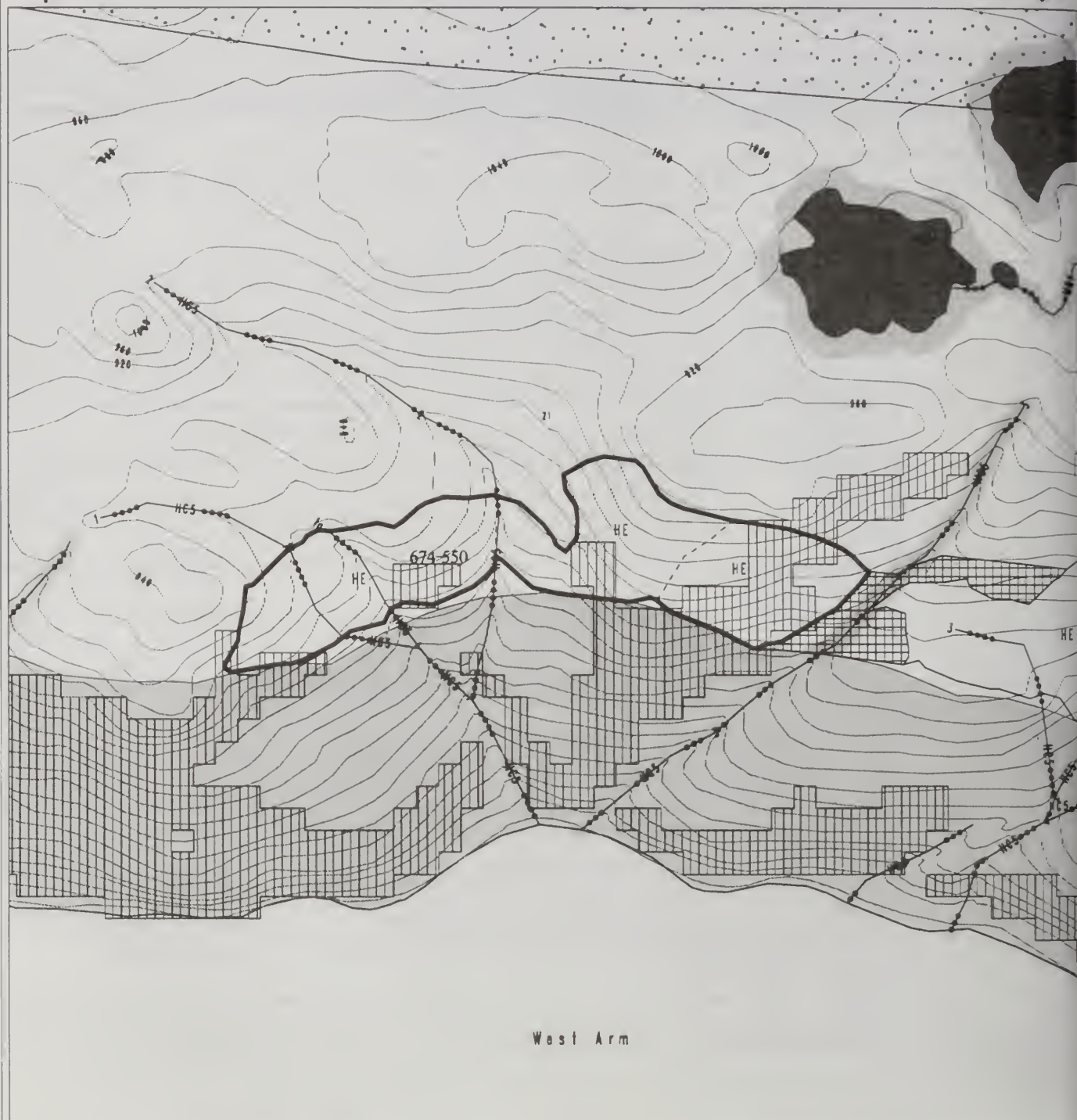
WATERSHED#: 000Z/ NAME/CAT#: ROAD#: None WINDTHROW RISK: moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F11, F15, F18, F21, T1, W7, W28, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	<p>SILVICULTURE/TIMBER Exam Stands- 43, 50, & 51; Superstand Net Vol/ac=26,853; Windthrow risk- medium; Logging system Options- Helicopter; Insects & Disease: Cedar dieback- high; Mistletoe low;</p> <p>Site Productivity- 2; Average Site Index (50yr)- 100.</p>
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	<p>SOILS/WATERSHED Slopes range from 50 to 80 percent gradient with an estimated 2 acres of slopes greater than 72 percent gradient. Rock outcrops and thin (< 20 inches) thick organic soils require full suspension to prevent detrimental soil displacements (BMP 13.9). The upper reaches of two water quality streams occur in the unit. The streams are shallowly incised and bedrock controlled. Riparian areas are un-mapable at a scale of 1:15,840 (BMP 12.6). See fisheries section for streamcourse protection measures (BMP 12..6a and 13.16). A beach buffer applies to the lower unit boundary.</p>
J.Hannon	<p>FISHERIES Checked for streams only at saltwater, no fish streams identified. Low concern watershed for fisheries. Unit contains three class IV streams which flow together into a class III below the unit. No buffers required in the unit.</p>
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	<p>WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit observed by boat. High value marten habitat (2-4 acres) must be left in the eastern half of the unit. 2.8-5.6 acres will need to be retained in the unit. Unit is adjacent to both an old growth reserve and a 1000 foot beach buffer.</p>
T.Fifield 10/18/98 J.Short J.Kluwe	<p>GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 674-537 discussion. RECREATION: See visuals section for design comments related to the recreation setting, as viewed from West Arm.</p>
G. Lawton 3/00	<p>PRESCRIPTION Potential for future entries when visually less sensitive, however may be uneconomical. Reserves for visual, marten and soils needs. <u>Even-aged clear-cut w/ reserves and even-aged overstory removal:</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use type C clear-cut, helicopter logging. Type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Helicopter logging system on entire unit. Soils full suspension is required over the entire unit. TLMP requires 2-4 acres of structural retention for high value marten habitat. Structural acreage credit and VQOs can be achieved by: clear-cut upper 2/3 of unit (type C), lower 1/3 OSR > 23.0 DBH removes 50% of the BA and ~13% of the trees(few large trees). Structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to 80 live trees >20"dbh and 60 snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Estimate volume (27MBFx9)+(27MBFx19x.5)=500. Future activities: regeneration surveys, harvest evaluation on non-clearcut portions, and precommercial thinning at 15 to 20 years. Full suspension required for soil protection. Unit adjacent to 1000' buffer. See BMPs listed above.</p>



Cholmondeley DEIS Unit 674-550



- Sollwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Cord)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setback Boundary (See Unit Cord for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-550 ACRES: 26 VOL: 612 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/590-67,66 1/4 QUAD: ELEV. RANGE: 400-800 ASPECT: S LOGGING SYSTEMS: HE

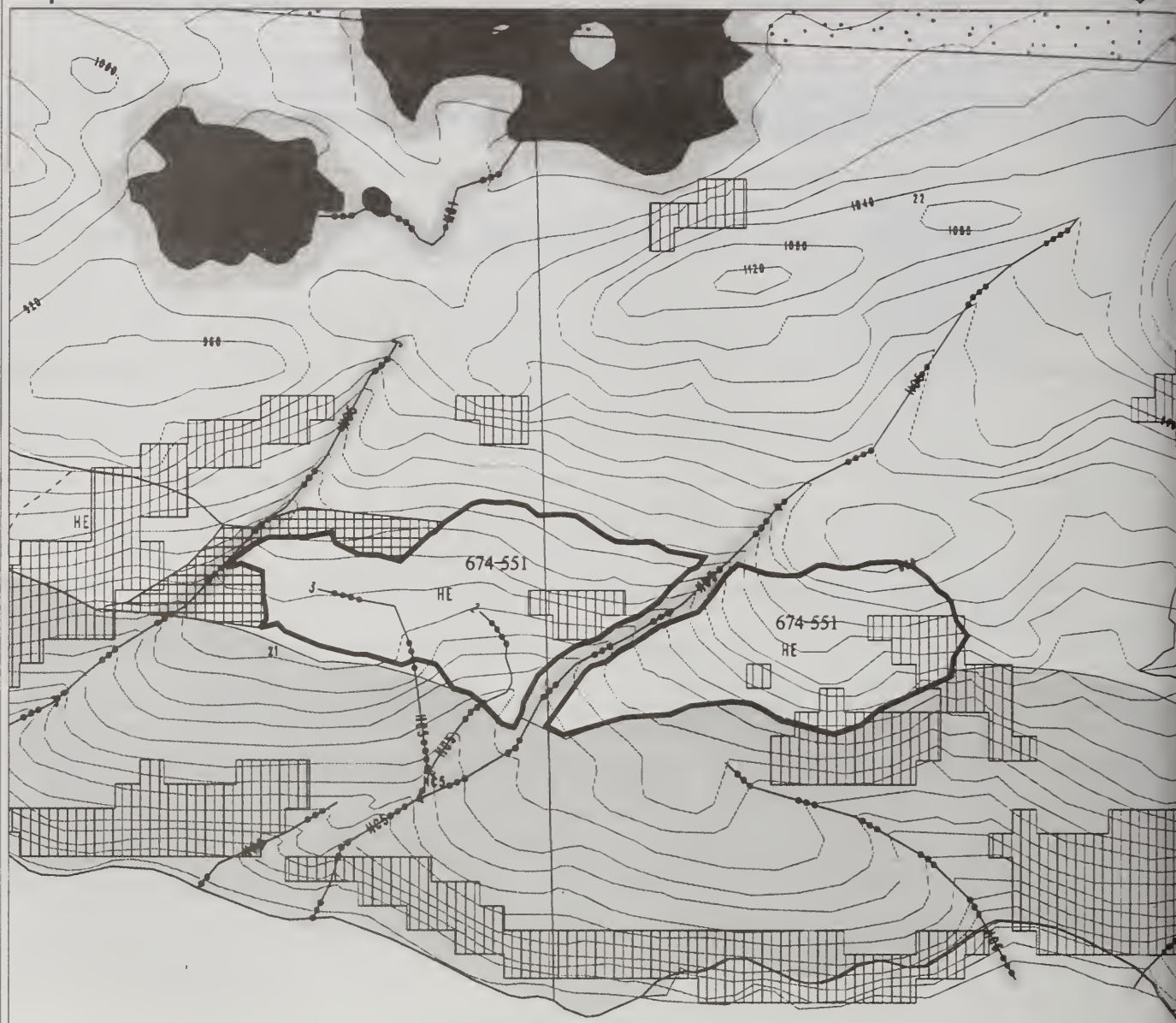
WATERSHED#: 000Z NAME/CAT#: ROAD#: None WINDTHROW RISK: moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F11, F18, F21, T1, W6, W7, W34, V1, V8,). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 19; Superstand Net Vol/ac= 53,935; (suspensions data) Regeneration System Options- CC, OSR; Windthrow risk- medium; Logging system Options- Helicopter; Site Productivity- 2; Average Site Index (50yr)- 100.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 50 to 90 percent gradient, with an estimated 4 acres of slopes greater than 72 percent gradient. Soils are dominantly less than 20 inches thick over bedrock and well drained. Use full suspension to minimize impacts to the soils resource, including landsliding (BMPs 13.5 and 13.9). Two water quality streams have small riparian areas below the slope-break (BMP 12.6). See fisheries section for streamcourse protection measures (BMP 12.6a and 13.16).
J.Hannon	FISHERIES Checked for streams only at saltwater, no fish streams identified. Low concern watershed for fisheries. Unit contains one class III, one O/W class IV and two G/W class IV streams. Buffer the class III stream with a slopebreak buffer. Split yard away from the O/W IV stream. No buffer required on the class IV streams. BMP 12.6, 13.16
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit observed by boat. There is no high value marten habitat in the unit. #.1-6.2 acres in the unit should be retained as a clear cut with reserves. Unit is adjacent to an old growth reserve and a 1000 foot beach buffer.
T. Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: This unit was surveyed by FS archaeologists during the 1997 field season. No cultural resources were noted. No further concerns. VISUALS: See Unit 674-537 discussion. RECREATION: See visuals section for design comments related to the recreation setting, as viewed from West Arm. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves(type C) and even-aged overstory remove:</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging, to leave non-merchantable trees and safe snags over the entire unit. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Soils full suspension is required on entire unit. No high volume strata or marten habitat exists in unit. <u>For visual concerns: Type C clear-cut the center 1/2 of the unit even-aged overstory remove >25.0 DBH on the east & west thirds quarters of the unit. This removes ~63% of the BA and ~42% of the trees.</u> Estimate volume (30MBFx13x.6)+(30MBFx13)x.90=632. Future activities: regeneration surveys and harvest evaluation on non-clearcut portions. Unit adjacent to 1000' buffer. See BMPs listed above.



Cholmondeley DEIS Unit 674-551



West Arm

- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beech Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLWP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-551 ACRES: 34 VOL: 714 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/590-66,67 1/4 QUAD: ELEV. RANGE: 500-800 ASPECT: S LOGGING SYSTEMS: HE

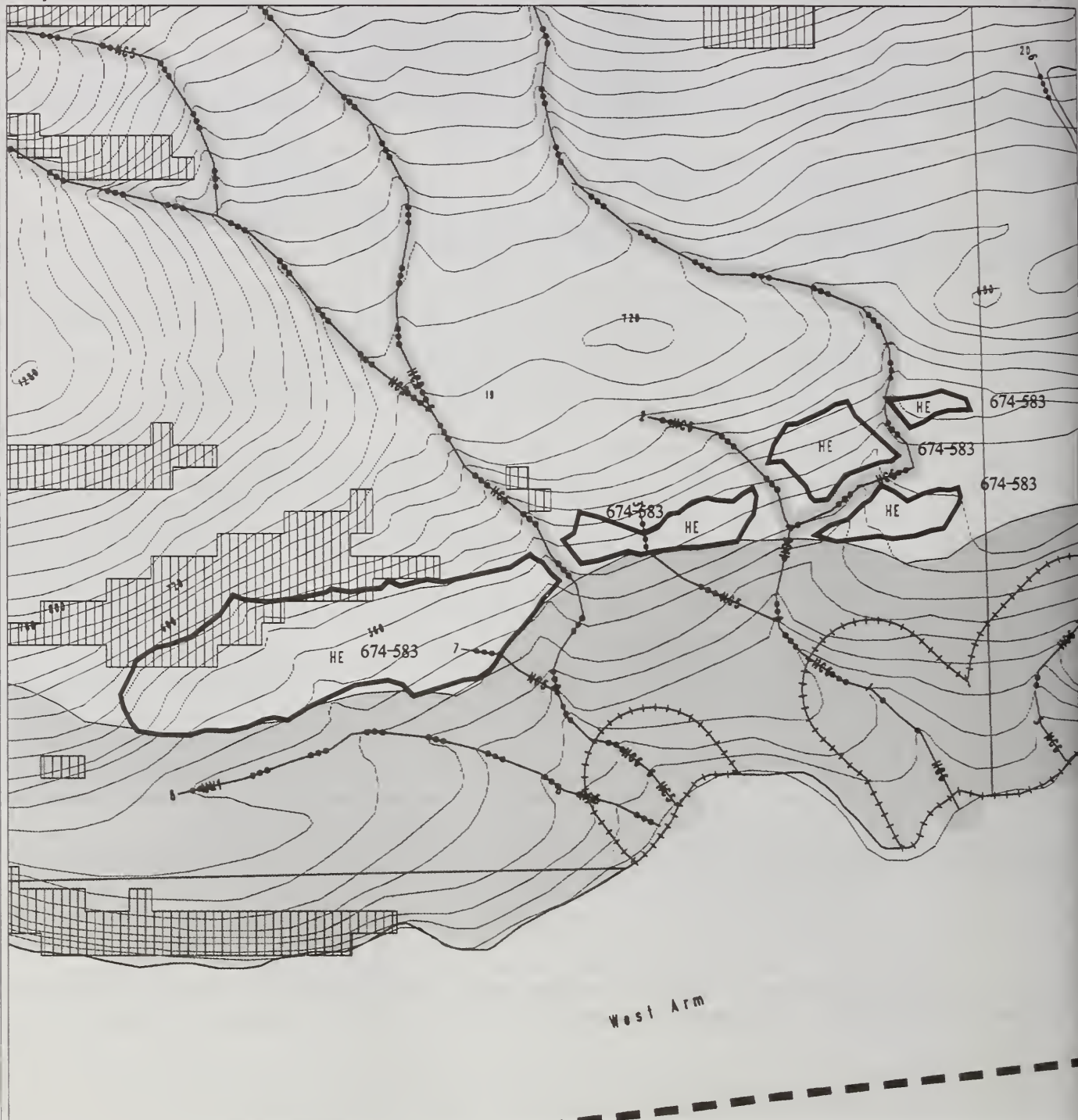
WATERSHED#: 000Z/ NAME/CAT#: ROAD#: None WINDTHROW RISK: moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F3, F11, F15, F18, F21, T1, W6, W28, W34, V1, V8,). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 44 & 43; Superstand Net Vol/ac= 31,080; Insects & Disease: n/a; Windthrow risk- medium; Logging system Options- Helicopter; Regeneration System Options- n/a; Site Productivity- 2; Average Site Index (50yr)- 100.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 50 to 80 percent gradient with an estimated 3 acres of slopes over 72 percent gradient. Soils are typically less than 20 inches thick over bedrock and small cliffs are common. Use full suspension to minimize impacts to the soils resource, including landsliding (BMP 13.5 and 13.9). Two streams have identifiable riparian areas below the slope-break (BMP 12.6). See fisheries section for streamcourse protection measures (BMPs 12.6a and 13.16).
J.Hannon	FISHERIES Checked for streams only at saltwater, no fish streams identified. Low concern watershed for fisheries. Unit contains one class III and two class IV streams. Buffer the class III with a slopebreak buffer. No buffer required on the class IV streams. BMP 12.6, 13.16
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit observed by boat. Marten habitat retention will be located around the stream which runs through the middle of the unit. If this stream is being buffered for visual reasons with a 100 foot buffer strip this would also count as marten habitat retention. Unit is adjacent to a 1000 foot beach buffer. Martin habitat requires 0.8-1.6 acres of retention.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 674-537 discussion. RECREATION: See visuals section for design comments related to the recreation setting, as viewed from West Arm
G. Lawton 3/00	PRESCRIPTION: Reserves for visual, marten and soils needs. <u>Even-aged clear-cut w/ reserves (type C) and even-aged overstory removal:</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Soils full suspension is required on the eastern 2/3 of unit. Adjacent to 1000' beach buffer. TLMP requires 1-2 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved through: visual mitigation measures. <u>Clear-cut type C the east & west 1/4s of the unit.</u> Within the center third of the unit there needs to be retention of .8-.16 acres by buffering the stream with a 100 foot buffer which will visually hide a portion of the upper unit. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, <u>but trees may be clumped for operational concerns</u> or ecological opportunities. This works out to <u>40</u> live trees >20"dbh and <u>30</u> snags >20"dbh(doms, codoms or GT 16" dbh) that need to be retained. These should be available in the leave clumps/buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave. The center of the unit will be treated with an overstory removal of trees >21.0" DBH. This removes ~50% of the BA and ~13% of the trees (many small trees take up the growing space). Estimated volume (30MBFx17.5)=(30MBFx17x.9). Future activities: regeneration surveys and harvest evaluation on non-clearcut portions. Unit adjacent to old growth reserves). See BMPs listed above.



Cholmondeley DEIS Unit 674-583



Soilwater	Encumbered National Forest System Land	TLWP Old Growth Reserve	Project Boundary	AHWU 3 Stream
RMA No Cut Buffer	Second-Growth Managed Stand	Selected Unit	300-Ft Offset From Stream	AHWU 4 Stream
1000' No Cut Beach Buffer	No Cut Area (See Unit Card)	Proposed Units	Planned New Specified Road Construction	40-Ft Contours
Freshwater	Slopes $\geq 72\%$	Logging Setting Boundary (See Unit Card for Harvest System Definitions)	Planned New Temporary Road Construction	Log Transfer Facility
State & Private Land			Streams	Proposed Landing
			AHWU 2 Stream	Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 674-583 ACRES: 26 VOL: 666 MBF ALTERNATIVES: 2,3,5

PHOTO YR/#: '91/390-20 1/4 QUAD: ELEV. RANGE: 200-400 ASPECT: S LOGGING SYSTEMS: HE

WATERSHED#: F23A, F24A, F25A, CV1A NAME/CAT#: Westest, 2nd Westest, 3rd Westest ROAD#: None

WINDTHROW RISK: moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F18, F21, W1, W6, W7, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 30 & 19; Superstand Net Vol/ac= 32,270; Insects & Disease: Mistletoe- high & Rot- medium; Downhill Yarding- >50%; Windthrow risk- medium; Logging system Options- Helicopter; Regeneration System Options- Clearcut type-D & Group Selection; Site Productivity- 2-H; Average Site Index (50yr)- 100.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 70 percent gradient. No slopes over 72 percent were identified. Was modified following reconnaissance to avoid landslide prone soils (BMP 13.2). The unit is a complex of forested uplands and forested wetlands. Use a minimum of partial suspension to control impacts to soil and wetland resources (BMP 12.5 and 13.9). Three water quality streams have identifiable riparian areas below the slope-break (BMP 12.6). The riparian areas will be entirely within the slope-break buffers. (BMP 12.6a). See the fisheries section for streamcourse protection measures (BMP 12.6a and 13.16).
J.Hannon	FISHERIES Streams field checked only at saltwater. Western stream is small with no fish observed. Second stream from west has potential pink salmon spawning in the intertidal zone and then a 25% gradient and 3m BFW. The eastern stream coming from the unit has potential pink spawning in the intertidal zone (3m BFW). A 10' falls is about 100' upstream. These are low concern watersheds for fisheries. Unit contains three class III and two class IV streams. Leave a slopebreak buffer on the class III streams. No buffer required on the class IV streams. BMPs 12.6, 13.16
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit observed by boat. There is no high value marten habitat in the unit. 10-20% (3-6 acres) of the unit should be retained for the type of clearcut. The unit is adjacent to an old growth reserve and a 1,000 foot beach buffer.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 674-537 discussion. RECREATION: Unit is in proximity to recreation sites in the West Arm of Cholmondeley Sound. See visuals section for design comments related to the recreation setting, as viewed from West Arm. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION (Reserves for visual needs.) <u>Even-aged clear-cut w/ reserves (type C):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging, would leave non-merchantable trees and safe snags over the entire unit. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Adjacent to 1000' beach buffer. No high volume strata exist in unit. Previously deleted acres due to high MMI. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Partial suspension required for soil protection. Volume estimated (32MBFx26x.80) See BMPs listed above.



Cholmondeley DEIS Unit 675-028



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLWP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Cord) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-028 ACRES: 16 VOL: 216 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR#/: '91/590-133 1/4 QUAD: ELEV. RANGE: 300-600 ASPECT: SW LOGGING SYSTEMS: RS

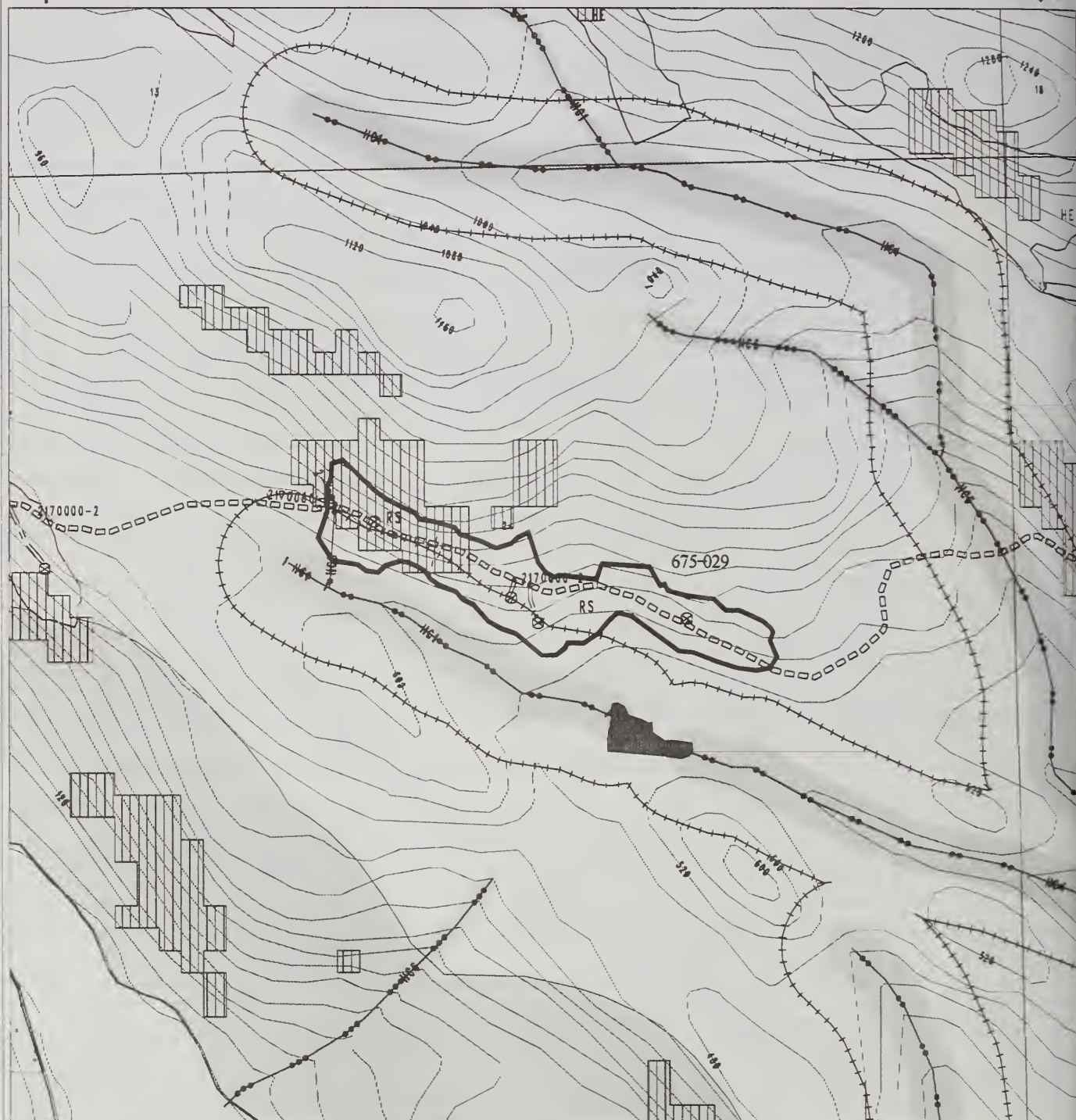
WATERSHED#: F28A NAME/CAT#: DRINKING WATER ROAD#: 2170000-1 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F6, F11, F18, F20, F21, W1, W6, W7, W28, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 41; Superstand Net Vol/ac= 19,457 (too high volume - poor quality, data suspect); LOW VOLUME Insects & Disease: Cedar dieback- high; Downhill Yarding- 33%; Windthrow risk-low; Logging system Options- Running Skyline; Site Productivity- 5; Average Site Index (50yr)- 50;
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 72 percent gradient. Unit 028 was modified following reconnaissance to avoid cliffs and unstable areas (BMP 13.5). About 5 acres of the unit classify as forested wetlands. Boulders and thin (< 20 inches thick) organic soils over bedrock occur in the northern portion of the unit. These thin soils are susceptible to detrimental soil displacements. Use partial suspension to keep impacts to the soil and wetland resources within standards. (BMPs 12.5, 13.5, and 13.9). One stream has an identifiable riparian area below the slope-break. (BMP 12.6). The riparian area will be entirely within the no-cut buffer. (BMP 12.6a). Leave an expanded buffer on the stream to minimize impacts to the domestic water users downstream. BMPs 12.6a, 13.2 and 13.16).
T.Paul J.Hannon 6/10/97	FISHERIES Stream #2 (numbering continued from unit 27): Class II, Flagging BW, C-type MC1 A 100' windfirm buffer is required on this stream. The stream was not walked along the unit but fish were found upstream of the unit. Stream# 5 Class III Flagging OW C-type HC2/5 A 100' buffer is required on this stream to protect the domestic water use downstream. We walked to 400' and incision increases further upstream. We did not check the unit for streams west of this one. No other streams are mapped. BMPs 12.6, 13.16
A.Moore L.Mosenthin 5/22/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. . It is poor goshawk habitat. The acreage retained for high value marten habitat needs to be located in either the southern half of the unit, in the northern portion of the unit or along the upper backline north of stream #5. Pacific yew trees were located within the unit boundary along the planned road line. The Pacific yew Act of 1992, sustainability should be provided for. Site specific prescriptions will ensure propagation of the species during initial harvest and through future stand treatments. High value marten habitat retains 1.3-2.0 with a minimum of 91 retention trees.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: Units 675-030, 029, 028, and 676-472, 462, 482, 489, 592 are all in the middle ground as seen from just outside the mouth of sunny Cove. They are all visible to one degree or another. The adopted VQO for this middleground area is modification. The adopted VQO for this middle ground area is modification. The size and separation of the units and the retention left in some of these units for other resource concerns will result in this group of units meeting the modification VQO. RECREATION: Unit is located above the community in Sunny Cove. See visuals section for design comments related to the recreation setting, as viewed from the mouth of Sunny Cove. Timing harvest/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 3/00	PRESCRIPTION Anticipate one-entry only within the unit boundary. Reserves for visual needs Even-aged clear-cut w/ reserves (type B); retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type B clear-cut to call for a specified number of snags and live replacements, seven trees per acre >20" diameter limits retained in 50 to 100 feet of the border (see below). Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. Yarding system difficulties due to: large rock outcrops & poor volume, very steep ground and McGilvery 40% of unit (Source: old rates). Requires 1-2 acres of structural retention for high value marten habitat. Structural acreage credit can be achieved through: 2 acres of buffers on stream #5 (class III or IV), and 20' additional RAW on center stream. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but <u>trees may be clumped for operational concerns</u> or ecological opportunities. This works out to <u>52</u> live trees >20"dbh and <u>39</u> snags >20"dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Maintain setting width between adjacent units. Not visited by silviculturist. R.S. logging system is anticipated on entire unit. Estimate volume (15MBFx16).90=216. Future activities: regeneration surveys and precommercial thinning at 25+ years. Full suspension required for soil protection (field review needed during layout). Unit near but not adjacent to 1000' buffer. PROTECT POTENTIAL DOMESTIC WATER STREAMS #2 AND #5. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevent contamination from oil spills, and potential written agreements. See BMPs listed above. Dropped cliff areas will also help mitigate potential sediment concerns. See BMPs listed above.



Cholmondeley DEIS Unit 675-029



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging-Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHMU 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-029 ACRES: 13 VOL: 187.2 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-134,3 1/4 QUAD: ELEV. RANGE: 600-800 ASPECT: SE LOGGING SYSTEMS: RS

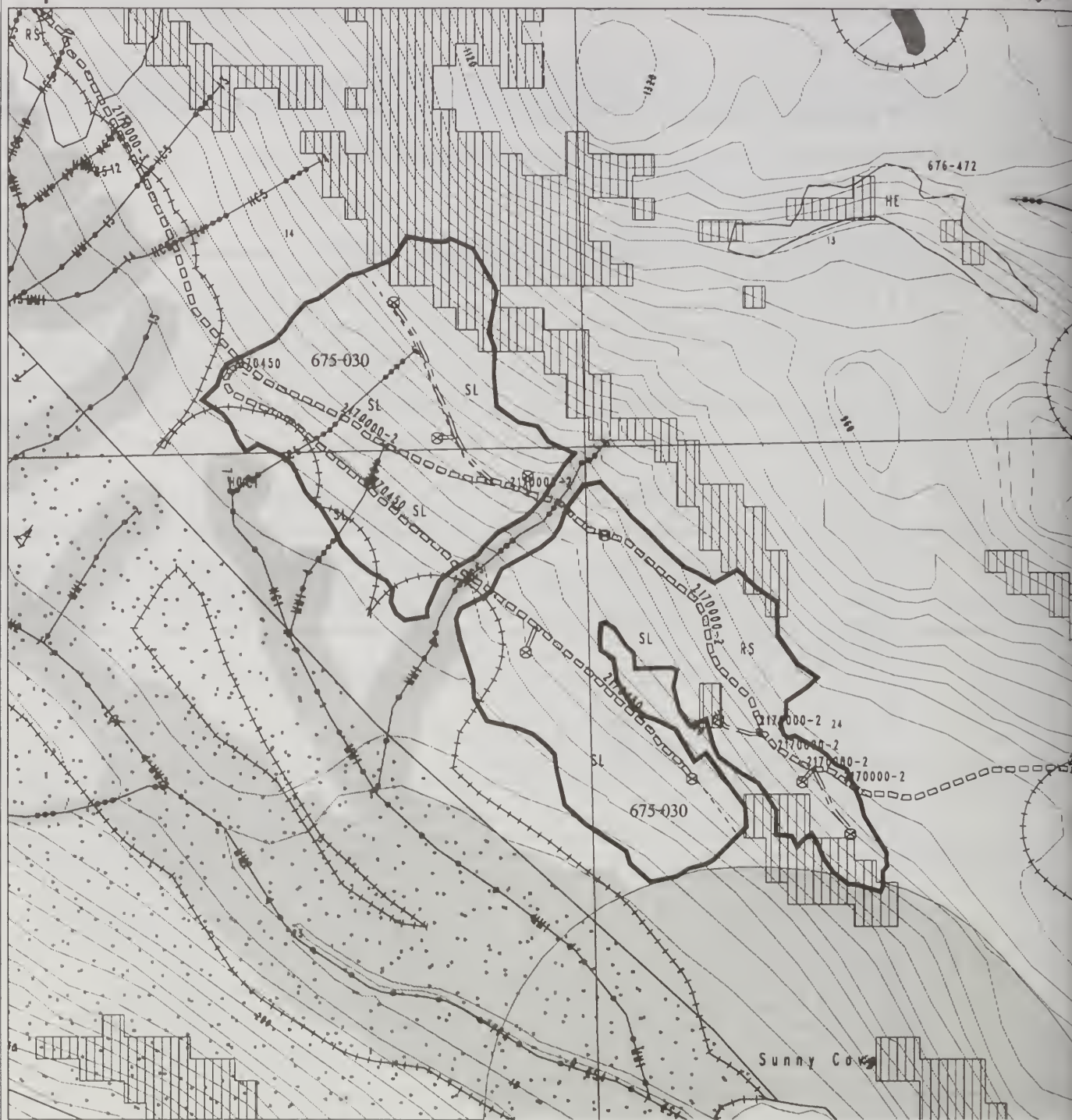
WATERSHED#: F28A NAME/CAT#: Drinking Water ROAD#: 2170000-2 WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F6, F11, F18, F20, F21, W1, W7, W20, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 46; Superstand Net Vol/ac= 15,627; Downhill Yarding- 66%; Windthrow risk- medium; Logging system Options- Running Skyline; Regeneration System Options- CC-B; Site Productivity- 4; Average Site Index (50yr)- 80. Not visited by Silviculturist.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 50 to 70 percent gradient. The southeast half of the unit classifies as forested wetlands. Thin (< 20 inches thick) organic soils over bedrock occur in the northwestern half of the unit. Use a minimum of partial suspension to keep detrimental impacts to soil and wetland resources within standards. (BMP 12.5 and 13.9) There are no identifiable riparian areas associated with stream 1 adjacent to the unit (BMP 12.6). See fisheries section for specific streamcourse protection measures (BMP 13.16). In the watershed that contributes to a domestic water supply, however the stream adjacent to the unit is very small, and a pond, just downstream could settle out heavier soil materials generated by harvest.
P.Moore T.Paul 7/14/97	FISHERIES Stream# <u>1</u> Class <u>IIA</u> Flagging <u>BW</u> C-type <u>HC1</u> 100' TTRA buffer required. Dolly varden present. We flagged from 460' to 560' elevation. Stream # <u>2</u> Class <u>IV</u> Flagging <u>G/W</u> C-type <u>HC5</u> no buffer required. <u>Lake:</u> Class <u>IIA</u> . 100' TTRA buffer required. The lake is simply a wide spot in stream #1. BMPs 12.6, 13.16
L.Mosenthin A.Moore 5/29/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit is a western hemlock/western red cedar/blueberry/salal plant association. It is recommended that during unit layout the southern unit boundary be kept upslope from the low productivity areas and that the streams leading into them remain undisturbed. No high volume strata exist in the unit to leave for marten.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See 675-028 discussion. RECREATION: Unit is located above the community in Sunny Cove. See visuals section for design comments related to the recreation setting, as viewed from the mouth of Sunny Cove.
G. Lawton 11/99	PRESCRIPTION: Reserves retained for visual and soils concerns. <u>Even-aged clear-cut w/ reserves</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type B clear-cut calls for a specified number of snags and live replacements with minimum of 16" diameter limits retained within 200 feet of the border, (seven large trees). Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. Leave reserve trees <u>only</u> along <u>upper</u> backline for visual mitigation. Trees shall be left in alternating cut/leave corridors extending into the unit 200 feet from the backline. No high volume strata or marten habitat exists in unit. Soils partial suspension is required on the west end. RS or SL logging systems are anticipated on entire unit, 66% downhill yarding. Maintain setting/area width between units. Approximately 1/2 of the original units retained on the edges for structure. Anticipate falldown of volume due to low volume. Estimate volume (16MBFx13)x.90. Future activities: regeneration surveys, release, and precommercial thinning at 25+ years. Partial suspension required for soil protection. Unit near but not adjacent to 1000' buffer. PROTECT POTENTIAL DOMESTIC WATER STREAM #1. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevent contamination from oil spills, and potential written agreements. Dropped cliff areas will also mitigate potential sediment concerns. See BMPs listed above.



Cholmondeley DEIS Unit 675-030



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|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RWA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Cord) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setling Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-030 ACRES: 67 VOL: 1876 MBF ALTERNATIVES: 2,3,4,5

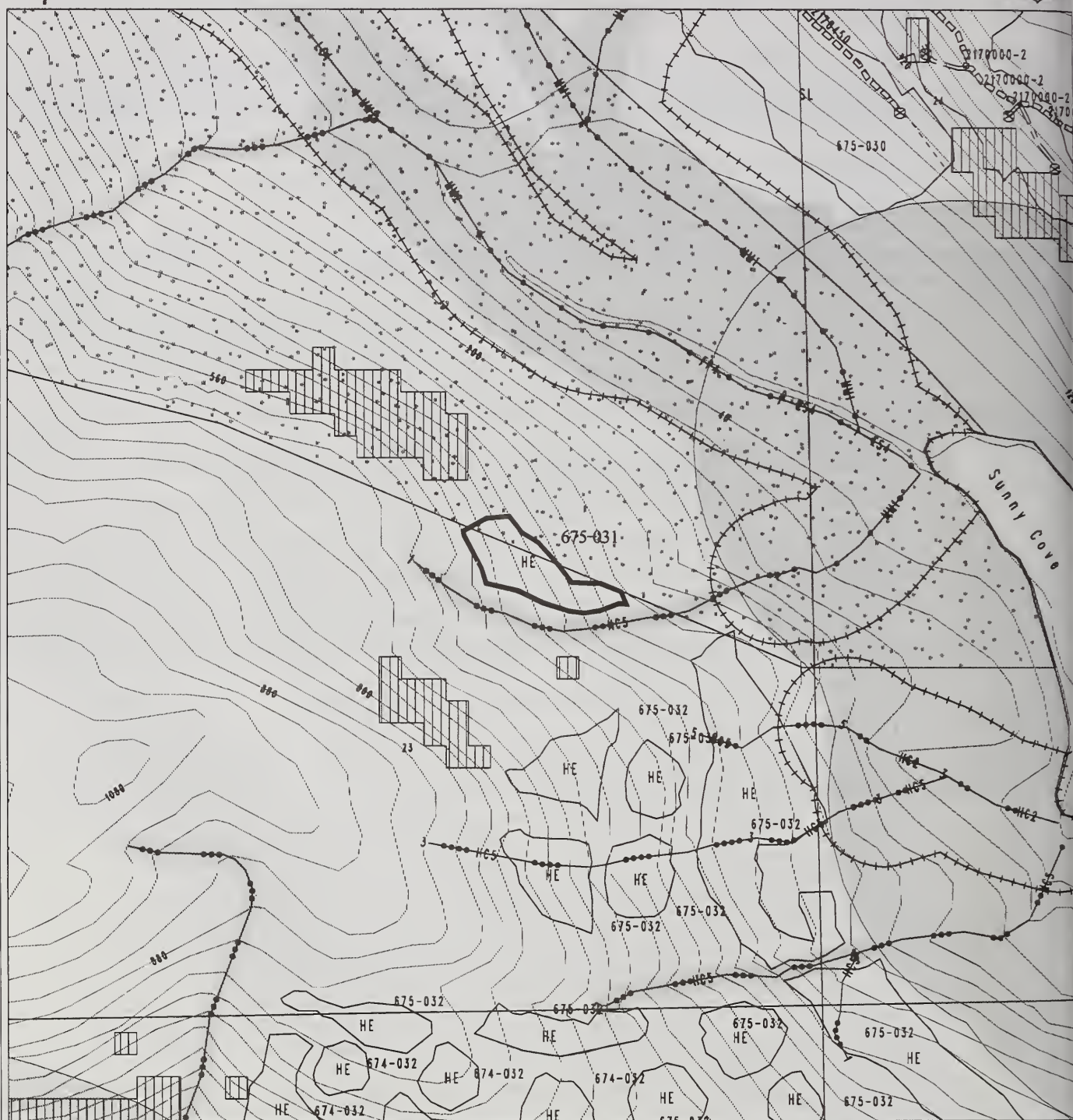
PHOTO YR/#: '91/590-18,19 1/4 QUAD: ELEV. RANGE: 200-600 ASPECT: SW LOGGING SYSTEMS: RS, SL

WATERSHED#: F27A NAME/CAT#: SUNNY/102-40-87 ROAD#: 2170000-2 WINDTHROW RISK: Moderate
 The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W7, W28, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 27, 28, & 46; Superstand Net Vol/ac= 35,337; Windthrow risk- medium Insects & Disease: Moderate CD Rot, Mistletoe, Fluting; ; Logging system Options-Running Skyline & Live Skyline; Site Productivity- 4; Average Site Index (50yr)- 80.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 80 percent gradient in unit 030 with approximately one acre of slopes over 72 percent gradient in the southeast portion of the unit. The unit includes approximately 24 acres of forested wetland/upland complex. Use a combination of partial and full suspension to keep impacts to the soil and wetlands resources within standards. (BMP 13.5, 13.9 and 12.5). There is a floodplain and estuary riparian area southwest of the unit and one water quality stream has a slope-break riparian area (BMP 12.6). The riparian areas are entirely within the no-cut buffers (BMP 12.6 and 13.16). See fisheries section for streamcourse protection measures (BMPS 12.6a and 13.16).
P.Moore S.Farzan T.Paul 6/17/97	FISHERIES Stream# <u>2</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>MM1</u> . A 120' no-cut buffer Stream# <u>4</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>HCI</u> Class I portion: 100' no cut buffer. Class IV portion: No buffer required. Stream# <u>5</u> Class <u>I</u> Flagging <u>BW</u> C-type <u>HCI</u> A 100' no cut buffer. Stream# <u>6</u> Class <u>I/IV</u> Flagging <u>BW/GW</u> C-type <u>HCI/HCS</u> Class I portion: 100' no cut buffer. Class IV portion: No buffer required. Stream# <u>8</u> Class <u>III</u> Flagging <u>O/W</u> C-type <u>HCS</u> Slope break buffer plus 50' on the east and 25' on the west for windfirmness. BMPs 12.6, 13.16
L.Mosenthin A.Moore 5/15/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit has an open understory. The retention of 6 acres for high value marten habitat will need to be located in the northwestern 2/3 rds of the unit (except along the upper boundary between the Class III stream #8 and Class IV stream #6). Acres needed for 10% deferral is 6.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See 675-028 discussion. RECREATION: Unit is located above the community in Sunny Cove. See visuals section for design comments related to the recreation setting, as viewed from the mouth of Sunny Cove.
G. Lawton 3/00	PRESCRIPTION: . Reserves for marten needs. <u>Even-aged clear-cut with reserves (type B)</u> Type B clear-cut calls for a specified number of snags and live replacements with 20" diameter limit retained in 50 to 100 feet of the border seven large, live trees/Ac. Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. Soils partial and full suspension is required on the band through center of unit. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to <u>the western 2/3</u> of the unit. They require <u>6</u> acres of structural retention for high value marten habitat credited in: near center cliffs, along southern and northern boundary lines and in buffers along streams. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to <u>216</u> live trees >20" dbh and <u>162</u> snags >20" dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Volume estimate 35MBF x 67 x .80. Unit adjacent to estuary buffer. Future activities: regeneration surveys, harvest evaluation on non-clearcut portions, release, and precommercial thinning at 15 to 20 years. Unit adjacent to 1000' buffer. Group Selection and stream buffers cover RAW needs. See BMPs listed above.



Cholmondeley DEIS Unit 675-031



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|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-031 ACRES: 3 VOL: 38 MBF ALTERNATIVES: 2,3,5

PHOTO YR#: '91/590-19,20 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT: NE LOGGING SYSTEMS: HE

WATERSHED#: 000Z/85 NAME/CAT#: 102-40-85 ROAD#: None WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F18, F21, W1, W7, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G.Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 19; Superstand Net Vol/ac= 12,180; Insects & Disease: Low Mistletoe & C.D; Downhill Yarding- 100%; Windthrow risk- medium; Logging system Options- Running Skyline, helicopter; Site Productivity- 4; Average Site Index (50yr)- 80
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 50 percent gradient. Slopes less than 45 percent gradient support forested wetlands. Use partial suspension to minimize impacts to soil and wetland resources (BMP 12.5 and 13.9). Stream buffers apply to the eastern boundary. (BMP 13.2). One water quality stream has a riparian area below the slope-break. (BMP 12.6). The riparian area will be entirely within the no-cut buffer. (BMP 12.6a and 13.16). See fisheries section for streamcourse protection measures. (BMPs 12.6a and 13.16).
P.Moore T.Paul 7/15/97	FISHERIES Stream# <u>1</u> Class <u>III</u> Flagging <u>OW</u> C-type <u>HC5</u> . Recommend slopebreak buffer with some additional trees recommended for windfirmness. The stream flows into Sunny Creek in the estuary. BMPs 12.6, 13.16
M.Dillman 4/1/98 and 4/99	WILDLIFE Wildlife did not visit this unit. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is no high value marten habitat in the unit. Unit is adjacent to an old growth reserve.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: This unit in foreground as seen from Sunny Cove. Objective is Partial Retention. This helicopter unit, because of its small scale and some structure being left due to retention of non-merchantable trees, will meet visual objectives. RECREATION: Unit is located west of Sunny Cove, opposite the community, and above and inventoried recreation site. See visuals section for design comments related to the recreation setting, as viewed from Sunny Cove. Timing harvesting/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the Sunny Cove area.
G. Lawton 3/00	PRESCRIPTION: One entry anticipated. Reserves for visuals. <u>Even-aged clear-cut w/ reserves (type C):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clearcut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Soils partial suspension is required on all of unit. No high volume strata or marten habitat exists in unit. Feather upper boundary for visual view from residences. Leaving a few extra trees as windfirm buffer on stream will help visuals concerns. If unit is expanded, more trees will have to be retained. Future activities: regeneration surveys, release, and precommercial thinning at 25+ years. Unit adjacent to 1000' buffer. Add 20' RAW buffer on stream. Road has been dropped across Sunny Creek. Estimated volume: (12x3)=36MBF See BMPs listed above.



Cholmondeley DEIS Unit 675-032



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- Slate & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHWU 2 Stream

- AHWU 3 Stream
- AHWU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-032 ACRES: 42 VOL: 1146 MBF ALTERNATIVES: 2, 3, 5

PHOTO YR/#: '91/590-19.20 1/4 QUAD: ELEV. RANGE: 400-600 ASPECT: NE LOGGING SYSTEMS: HE

WATERSHED#: 000Z NAME/CAT#: ROAD#: None WINDTHROW RISK: High

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, K1, F11, F18, F21, W1, W7, W28, W34, V1, V8). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 42 & 19; Superstand Net Vol/ac= 34,292; Insects & Disease: Mistletoe- high & Rot- medium; Downhill Yarding- ; Windthrow risk- high; Logging system Options- Helicopter, & Slackline Skyline; Regeneration System Options- Clearcut type-D & Group Selection; Site Productivity- 2-H; Average Site Index (50yr)- 100.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 70 percent gradient in unit 032. Approximately half of the proposed unit classifies as forested wetlands. Low and moderate vulnerability karst occurs in the southeastern half of the unit. Use partial suspension to keep impacts to soil and wetland resources within standards. Helicopter yarding may be necessary to protect karst resources. (BMPs 12.5, 13.5 and 13.9). Three small water quality streams have identifiable riparian areas below the slope-break (BMP 12.6). The riparian areas will likely be within the slope-break buffers (BMP 12.6a and 13.16). See fisheries section for streamcourse protection measures.
J.Hannon 9/11/99	FISHERIES The unit was not visited by fisheries. Evaluate any streams during layout and protect appropriately. These are low concern watersheds for fisheries. One class III (stream #2) and three class IV (stream # 1, 3, &5) streams flow through the unit. Buffer the class III stream with a slopebreak buffer. The patch cut should add windfirmness. No buffer required on the class IV streams. BMP 12.6, 13.16
A.Moore D.Newell F.Broderick 8/14/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Unit observed by boat. High value marten habitat retention, (1.6-3.2 acres), will need to be located in the southeastern corner of the unit, or starting on the east boundary at stream #0 and gradually working towards the southwestern corner of the unit. Unit is adjacent to 1,000-foot beach buffer.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: Unit 675-032 in foreground view. Therefore adopted VQO is also partial retention. Recommend that upper steeper portions of this unit be partial cut, using individual tree or group selection so that a forested texture is still predominant and harvest in these sections is not apparent. RECREATION: Unit is located west of Sunny Cove, opposite the community, and above an inventoried recreation site. See visuals section for design comments related to the recreation setting, as viewed from Sunny Cove.
G. Lawton 3/00	PRESCRIPTION: Future entries would be limited to helicopter yarding. Reserves for visuals, soils and marten needs. <u>Uneven-aged management Group selections (top half) and even-aged clear-cut with reserves (type C) (bottom half).</u> Soils partial suspension is required. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to <u>the western 2/3</u> of the unit. They require 1.6-3.2 acres of structural retention for high value marten habitat credited in: Deleted acres due to high MMI, Karst and McGilvery soils, stream corridors. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags(greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to <u>136</u> live trees >20"dbh and <u>102</u> snags >20"dbh that need to be retained. These should be available in the leave areas /buffers mentioned above(need field verification). If trees are not available additional trees will have to be marked or clumped to leave Visual concerns ask for >50% retention on the steeper portions of the unit. Complications include large trees, steep slopes with high MMI soils and high windthrow risk. Below the center of unit use: type C clear-cut which would leave non-merchantable trees and safe snags over the entire unit. This type of clearcut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. <u>Use Group Selections of 1-2 acres in size, result in 50% of the area above the center of the unit containing harvest (50% retention).</u> Group Select ~15 acres of 35 acres in uneven-aged management. Estimate volume(40MBFx25x.50) + (40MBFx17x.95). Future activities: regeneration surveys, harvest evaluation on non-clearcut portions, release, and precommercial thinning at 15 to 20 years. Unit adjacent to 1000' buffer. Road across Sunny Creek dropped due to many resource and public concerns. See BMPs listed above.



Cholmondeley DEIS Unit 675-033



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|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLWP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-033 ACRES: 105 VOL: 3786 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR#:91/590-18,17 1/4 QUAD: ELEV. RANGE: 200-1500 ASPECT: SW LOGGING SYSTEMS: HE, RS

WATERSHED#: F27A NAME/CAT#: SUNNY/102-40-87 ROAD#: 2170000-3 WINDTHROW RISK: High

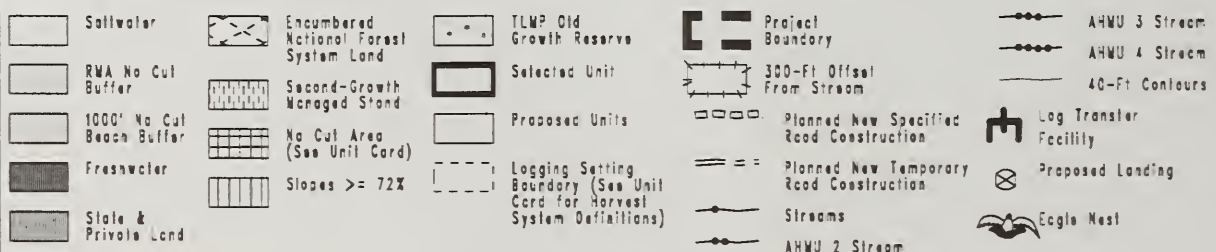
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F1, F18, F21, T1, W1, W7, W28, W34, V1). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G.Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 30, 47, & 12; Superstand Net Vol/ac= 42,391; Insects & Disease: Cedar dieback- high; Downhill Yarding- 90%; Windthrow risk- high; Logging system Options- Helicopter, & Running Skyline; Regeneration System Options- CC; Site Productivity- 2/4; Average Site Index (50yr)- 100/80.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 40 to 100 percent gradient with an estimated 18 acres of slopes over 72 percent gradient. Unit 033 was modified following Soil Scientist reconnaissance to exclude areas unsuitable for timber harvest (BMP 13.5). Use a combination of partial suspension and full suspension, and strategically placed no harvest areas to minimize impacts to soils, especially from landsliding (BMPs 13.2, 13.5, 13.9). A rationale for timber harvest on slopes over 72 percent is included in the Soils Resource Report. There is a large colluvial/alluvial fan riparian area in the northwest corner of the unit. There are two streams with identifiable riparian areas below the slope-break. (BMP 12.6). The riparian areas will be entirely within the buffers (BMPs 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMPs 12.6a and 13.16). Windthrow potential is high in the unit and the reasonable assurance of windfirmness zone needs to reflect the increased probability for windthrow. (BMPs 13.2, 12.6a and 13.16).
S.Farzan P.Moore J.Hannon 5/29&30/97	FISHERIES Stream# <u>1-Sunny Creek Class I Flagging BW C-type MM2</u> A 300' no cut buffer is recommended along the eastern 2/3 of the unit and 200' along the west end of the unit--roughly the 250' elevation line for the lower unit boundary. <u>An additional approximately 100' of partial cut along the buffer is recommended for windfirmness of the stream buffer.</u> Stream# <u>2 Class III Flagging OW C-type AF2/HC6</u> A 140' buffer from the active channel is required on the AF2 portion (up to about 560' elevation). The HC6 portion requires a slopebreak buffer. An additional one tree height buffer (~100') is recommended past the slopebreak for future woody debris recruitment in the stream. Stream# <u>3 Class I/IV Flagging BW/GW C-type HC5</u> Class I portion is within Sunny Creek buffer. Class IV portion is within an unstable area--looks like an old slump. No buffer on class IV portion. Stream# <u>4 Class III/IV Flagging OW C-type HC5</u> Recommend slopebreak buffer to top of class III at 900' elevation. Stream # <u>4A Class IV Flagging G/W C-type HC5</u> . no buffer required. Stream# <u>5 Class IV Flagging GW C-type HC5</u> Flows into #4 at 900' elevation. Stream# <u>6 Class III Flagging OW C-type HC5</u> Flows together with #4 at 700' elevation. No flow when reviewed but recommend slopebreak buffer due to incision. Stream# <u>7 Class I/IV Flagging BW/GW C-type HC2/5</u> Class I/IV break is about 100' out from Sunny Creek (buffer class I 100'). Flagged to 450' elevation. Stream# <u>8 Class I Flagging BW C-type HC2</u> Class I for about 500' along the stream from Sunny Creek (100' buffer). It may need to be class IV above--evaluate during layout. Stream# <u>9 Class I Flagging BW/GW C-type HC2/5</u> Class I buffer 100'. no buffer on class IV--stream might not reach the unit. Stream# <u>10 Class IV Flagging GW C-type HC5</u> flows into #9, flagged & tagged at 150' elevation at #9 intersection. Stream is class I B/W at intersection with #9. Stream# <u>11 Class I/IV Flagging BW/GW C-type HC5</u> Class I to intersection w/#12, 100' buffer, A slide is at the top of the stream and the tag at the top of the slide says stream #12 at 350' elevation. Streams 12-15 are also flagged but are probably east of the unit boundary, see fish reports for details. Coho and steelhead timing will be needed for road construction across class III streams. BMPs 12.6, 13.16, 14.6, 13.5
A.Moore D.Newell 6/12/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. Plucked feathers from a varied thrush were found just beyond call station #2.. Unit has an open understory and is fairly good goshawk habitat. Unit is a western hemlock/western red cedar/blueberry and western hemlock/blueberry plant associations. The acreage retained for high value marten habitat can be left anywhere in the unit except the extreme northeastern corner or small are in the southeast corner. Wildlife would prefer that the retention be located as an extension of the buffer on Sunny Creek. There are two small areas of grassy bogs in the lower part of the unit that could be wildlife leave areas. The first area is located just to the south and east of stream #7 and the second is approximately centered around stream #3 and extends to both the northwest and southeast. The stream buffer on both of these streams could be enlarged to encompass these wetland areas and it would count towards the acreage needed to meet the requirement for marten habitat. The area between streams #4 and #6 at 700 to 1300 feet in elevation will credit towards marten habitat (5 acres). 8-20 more acres of high value marten habitat still need to be identified and retained. The helicopter setting boundary was moved downhill, and as a result increased the portion of the unit that will be helicopter logged.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns RECREATION: Unit is located northwest of Sunny Cove. Recreation use in the vicinity of the unit is not probable.

<p>G. Lawton 3/00</p>	<p>PRESCRIPTION: Potential future entry if economical. Reserves for soils and marten mitigation.</p> <p><u>Even-aged clear-cut with reserves (Type B) below and even-aged overstory removal in the helicopter above:</u> Type B clear-cuts call for number of snags and live replacements with 20" minimum diameters retained in 50 to 100 feet of the border. Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for.</p> <p>The area above cable reach will be helicopter removal via even-aged overstory removal >20.9 dbh. This would remove 2/3 of the BA and 75% of the volume across all species combined.</p> <p>TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCUs where < 33% of existing POG has been converted to young growth stands. These apply only to <u>the western 2/3</u> of the unit (doesn't match wildlife). They require 10-20 acres of structural retention for high value marten habitat credited in: <u>no-cut areas and</u> 100' buffers along the two major streams up through the unit or in the area of approximately 16 acres was dropped for steep slopes. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. This works out to 460 live trees >20" dbh and 345 snags >20" dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave. 6 acres of scrub dropped in SE corner.</p> <p>The cable portion above the road should be logged with slackline as far as possible and still achieving suspension for soils.</p> <p>Estimate volume $(40\text{MBF} \times 69) + (30\text{MBF} \times 36 \times .95) = 3786 \text{ MBF}$ Future activities: regeneration surveys, harvest evaluation on non-clearcut portions, release, and precommercial thinning at 15 to 20 years. Partial suspension required for soil protection. Western stream is HC6 channel with additional 100'. See BMPs listed above.</p>
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Cholmondeley DEIS Unit 675-037



660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 675-037 ACRES: 43 VOL: 1103 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/590-69,70 1/4 QUAD: ELEV. RANGE: 400-900 ASPECT: SW LOGGING SYSTEMS: H

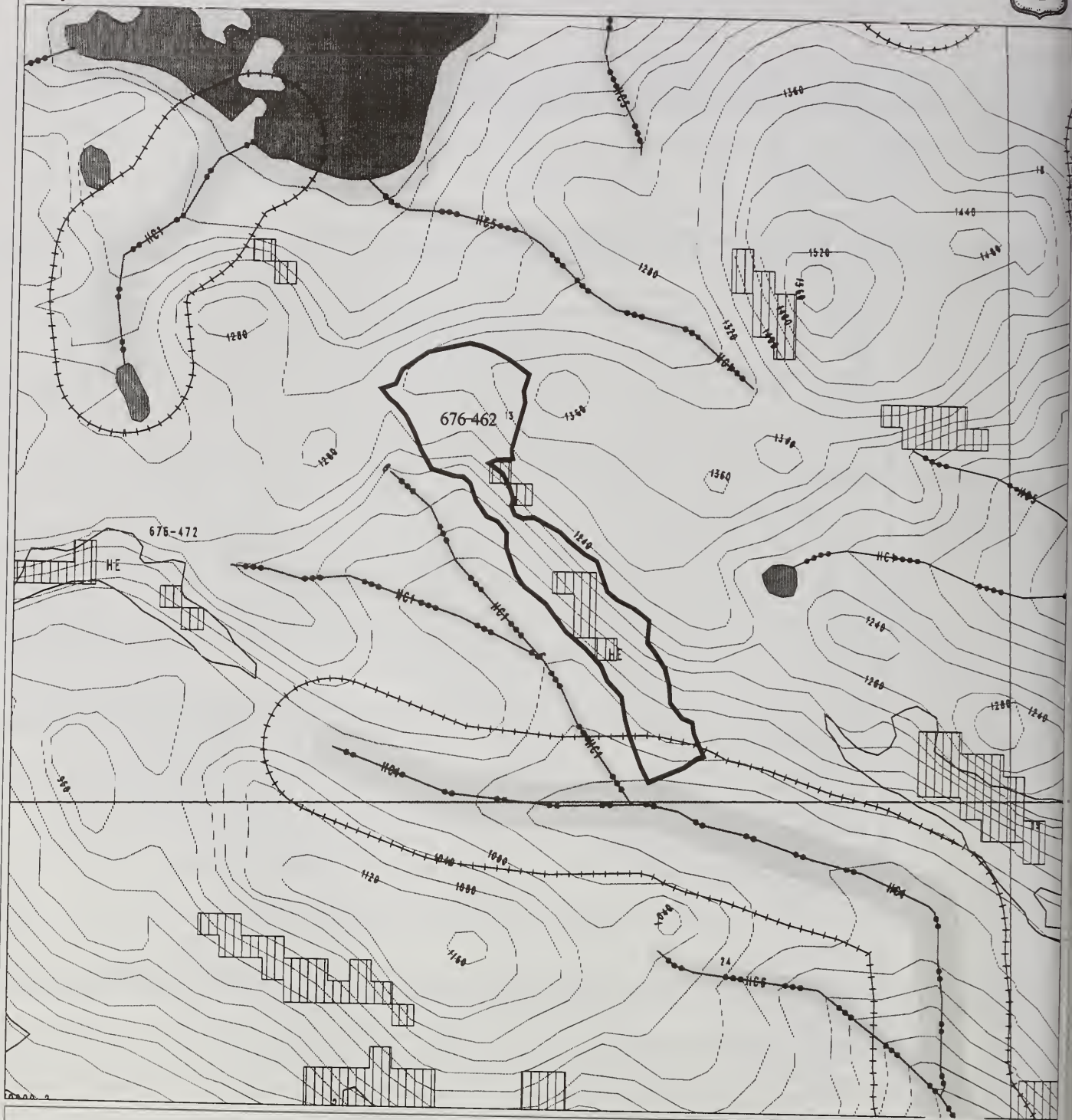
WATERSHED#: F27A NAME/CAT#: Sunny/102-40-87 ROAD#: 2170000-3 WINDTHROW RISK: High

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F3, F11, F15, F18, F21, W1, W7, W28, W34, V15). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 25 & 22; Superstand Net Vol/ac= 26,797; Downhill Yarding- 90%; Windthrow risk- medium - high; Logging system Options- Running Skyline & Slackline; Regeneration System Options- several; Site Productivity- 4/2; Average Site Index (50yr)- 75/100.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 50 to 100 percent gradient with an estimated 8 acres of slopes over 72 percent gradient. Unit 037 was modified following reconnaissance to avoid unstable areas (BMP13.5). The steep slopes are associated with a cliff along the upper unit boundary. A rationale for allowing timber harvest on slopes over 72 percent gradient is included in the Soil Resource Report. On slopes over 80 percent soils are thin, (< 20 inches thick) organics over bedrock. These soils are susceptible to displacement during yarding of logs. Use a combination of partial and full suspension to minimize soil displacements and landsliding. (BMPs 13.5 and 13.9). The south boundary stream flows in a large V-notch with a slope-break riparian area that transitions into an alluvial fan riparian area at the footslope. At least two smaller streams have slope-break riparian areas in the northern portion of the unit. (BMP 12.6). The riparian areas are entirely within the no-cut buffers. (BMPs 12.6a and 13.16). See fisheries section for streamcourse protection measures. Windthrow is common in the unit and the reasonable assurance of windfirmness zones needs to reflect the increased probability for windthrow (BMPs 13.2, 12.6a and 13.16).
P.Moore S.Farzan J.Hannon 5/22/97	FISHERIES Stream# 1--Sunny Creek Class I Flagging BW C-type MM2/1 200' buffer--will be wider in most areas due to non-commercial timber and tributary stream buffers. Stream# 2 Class I/III Flagging BW/OW C-type MM1/HC6 recommend 120' buffer + 50' with 16" dbh limit on class I, Class III slopebreak buffer + 50' partial cut for windfirmness--southeast boundary. Recommend bridge for road crossing on this stream. Stream# 3, 4, & 5 Class I/IV Flagging BW/GW C-type MM1/HC5 120' buffer in class I then no buffer on class IV. Stream# 6 Class I/IV Flagging BW C-type HC5 class I is in non-commercial, top of class IV at 600' elevation--lots blowdown. Stream# 7 Class IV Flagging GW C-type HC5 no buffer, top flagged & tagged at 600' elevation. Stream# 8 Class I/IV Flagging BW/OW/GW C-type MM1/HC5 120' buffer on class I, split on OW portion, no buffer. Stream# 9B Class I Flagging BW/OW C-type MM1/HC5 buffer 100' off top of class I, leave a slopebreak buffer of a few trees on the OW portion because lots of bedload is held back by wood in this stream. Stream #9A Class IV Flagging G/W C-type HC5 no buffer. Stream #10, 10A, 11 Class I/IV Flagging B/W, G/W C-type HC2/HC5 small streams, buffer class I 100', no buffer on class IV. Unit changed to helicopter logging so no timing needed. BMPs 12.6, 13.16, 14.6
L.Mosenthin A.Moore 5/27/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is some blowdown present in the unit. The unit is a western hemlock/blueberry/devils club plant association. If the acreage for high value marten habitat is left between the streams #8 and #9 it will need to be above 560', between streams #7 and #8 it will need to be between 440' and 800'; between streams #6 and #7 the retention will need to be above 360'. The entire area to the east of stream # 6 and above the road qualifies as high value marten habitat as does the extreme northwestern portion of the unit. 4.3-8.6acres will be retained for 10-20% retention.
D.Sholly 5/2000 T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: Eleven mining claims present, protect and/or replace all claim markers. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns RECREATION: Unit is located northwest of Sunny Cove. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION: One entry anticipated due to difficult terrain and difficulty of removing reserves. Reserves for soils and marten mitigation. <u>Even-aged clear-cut w/ reserves (type B):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type B clear-cut which calls for a specified number of snags and live replacements with minimum diameter of 20" retained in 50 to 100 feet of the border. Due to the flexibility of the setting boundaries, live reserve trees may only be required wherever a stream buffer is called for. Soils, partial suspension is required on most of unit. TLMP standards and guidelines require retention of specific structure on high value marten habitat in high risk biogeographical provinces with VCU's where < 33% of existing POG has been converted to young growth stands. These apply only to most of the unit. They require 5-10 acres of structural retention for high value marten habitat credited in: potential retention of 10 acres around several of the streams in the center of the unit (possible cliffs) or 8 acres of steep slopes dropped. These structural requirements also call for the retention of: four large (greater than 20" dbh) trees per acre and three snags (greater than 20" dbh) and an overall average canopy cover of 30% (doms, codoms or GT 16" dbh). The intent is for uniform distribution, but trees may be clumped for operational concerns or ecological opportunities. Calculates to 192 live trees >20" dbh and 144 snags >20" dbh that need to be retained. These should be available in the leave clumps/buffers mentioned above (need field verification). If trees are not available additional trees will have to be marked or clumped to leave. Salvage blowdown where possible. Leave as much windfirm trees as possible. Presale See profiles. SL above the road and RS below the road. Estimated volume (27MBF x 43 x .95). Avoid rocks in NW corner and cliff along the whole backline which may prevent cable above. Windthrow at the bottom of unit. Don't expand into unstable adjacent areas. Future activities: regeneration surveys and release. Partial suspension required for soil protection. Additional 50' RAW on eastern stream. See BMPs listed above.



Cholmondeley DEIS Unit 676-462



- Saltwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- State & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Olisot From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours

- Lag Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-462 ACRES: 14 VOL: 176 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-133,2 1/4 QUAD: ELEV. RANGE: 1000-1100 ASPECT: NE LOGGING SYSTEMS: HE

WATERSHED#: F31A NAME/CAT#: ROAD#: None WINDTHROW RISK: Moderate - Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F1, F11, F18, F20, F21, W1, W7, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands-25; Superstand Net Vol/ac=14,231; Barely merchantable volume; much cedar dieback moderate WT risk, 2-story, majority pole sized trees, very steep areas in NW; Logging systems options: HE,RS uneconomical; a regenerations systems:CC-D w/seed trees retained; OSR.14"
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 50 to 80 percent gradient with approximately 1 acre on slopes over 72 percent gradient. Use a minimum of partial suspension to keep soil displacements within soil quality standards (BMP 13.5, and 13.9). Full suspension is planned. One stream on the southwest side of the unit has a riparian area below the slope-break. The riparian area will be entirely within the buffer (BMPs 12.6, 12.6a and 13.16). See fisheries section for streamcourse protection measures.
J.Hannon 9/99	FISHERIES Unit not visited by fisheries. GIS shows a class II on the south side, class III on the southwest (stream #6). Plan for a 100' buffer on the class II (HC1) and a slopebreak buffer on the class III. Evaluate all streams during layout and apply appropriate protection measures. No streams in unit or affecting unit boundaries BMP 12.6, 13.16
A.Moore T.Sapozhnikova 8/20/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density Unit is mixed conifer/blueberry, mixed conifer/copperbush/deer cabbage and mixed conifer/copperbush plant associations No high value marten habitat in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See unit 675-028 discussion. RECREATION: Unit is located north of Sunny Cove. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION One entry isolated timbered stand. <u>Even-aged clear-cut w/ reserves(type C):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging would leave non-merchantable trees and safe snags over the entire unit. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Leave cedar seed trees on perimeter for seeding. option: drop road to 676-472, 462,489 and helicopter all three. No high volume strata exists in unit. Deleted acres due to steep terrain. Future activities: regeneration surveys, Yellow Cedar planting, seed collection, survival survey, and pre-commercial thin @ +25yrs. Minimum of Partial suspension required for soil protection. PROTECT POTENTIAL DOMESTIC WATER STREAM #1. See Fisheries section. Additional mitigation for activities upstream of domestic water users include (F20): increased buffers mentioned above, fuel storage, refueling and maintenance will occur outside watershed, timing of road construction to avoid extremely wet periods, capping off water intakes during construction, rockpit development outside of watershed, sediment traps, consideration of bridges versus culverts, prevent contamination from oil spills, and potential written agreements. Poor volume. (14MBFx14x.9) See BMPs listed above.



Cholmondeley DEIS Unit 676-472



- Soilwater
- RMA No Cut Buffer
- 1000' No Cut Beach Buffer
- Freshwater
- Slate & Private Land

- Encumbered National Forest System Land
- Second-Growth Managed Stand
- No Cut Area (See Unit Card)
- Slopes $\geq 72\%$

- TLMP Old Growth Reserve
- Selected Unit
- Proposed Units
- Logging Setting Boundary (See Unit Card for Harvest System Definitions)

- Project Boundary
- 300-Ft Offset From Stream
- Planned New Specified Road Construction
- Planned New Temporary Road Construction
- Streams
- AHMU 2 Stream

- AHMU 3 Stream
- AHMU 4 Stream
- 40-Ft Contours
- Log Transfer Facility
- Proposed Landing
- Eagle Nest

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-472 ACRES: 5 VOL: 70 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR#: '91/590-18 1/4 QUAD: ELEV. RANGE: 1200 ASPECT: S LOGGING SYSTEMS: HE

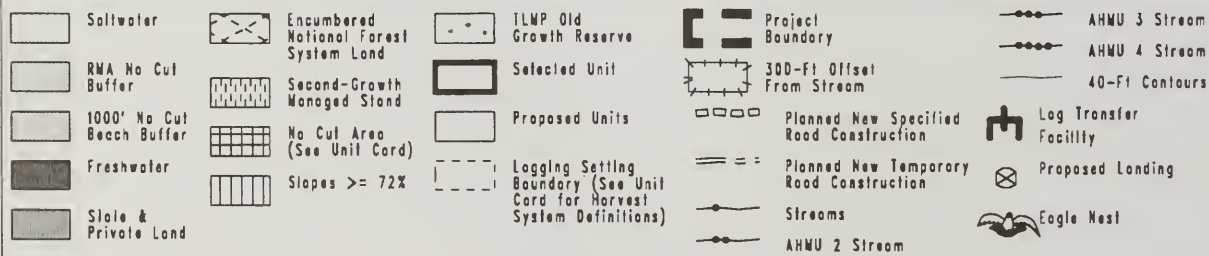
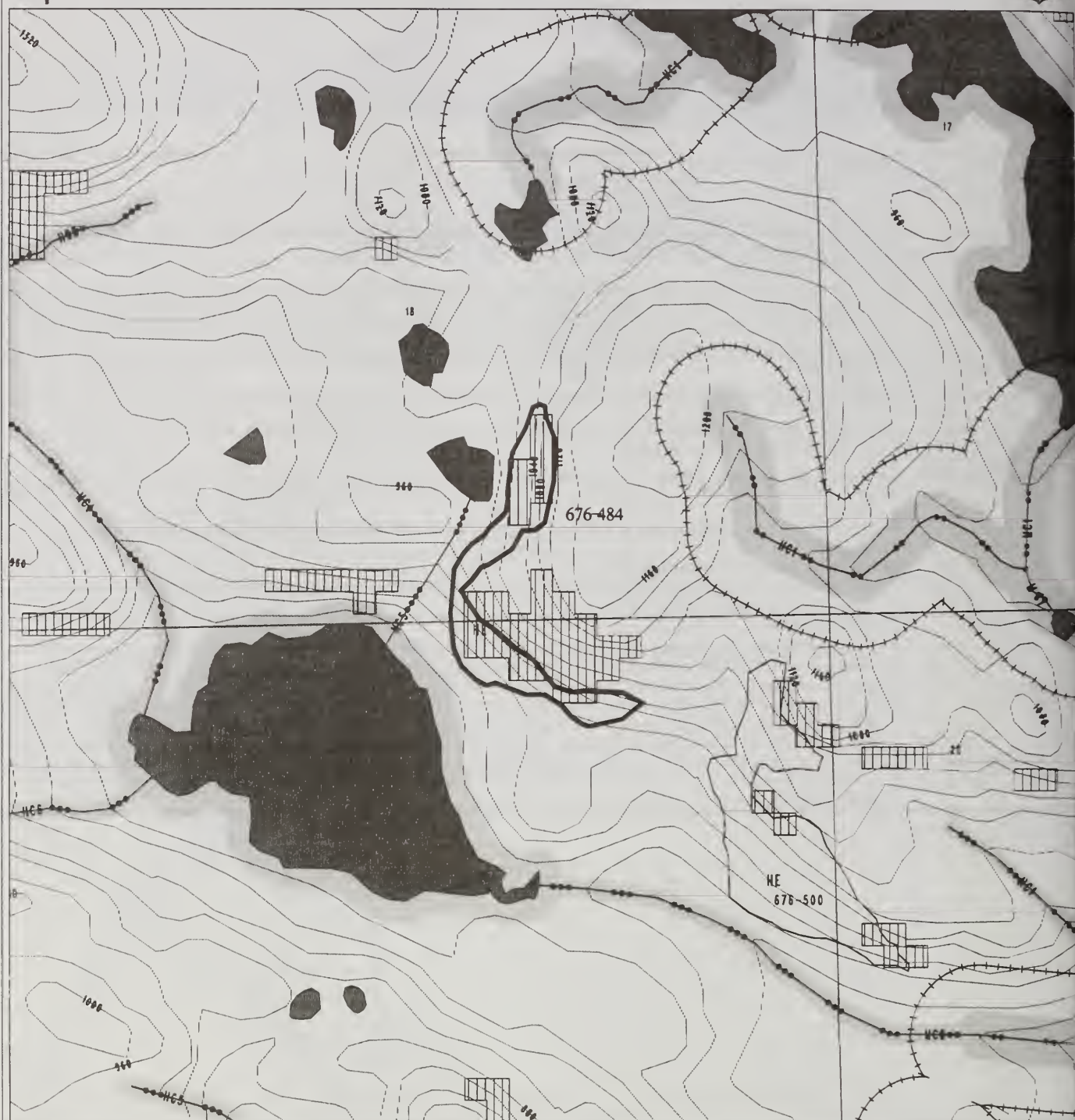
WATERSHED#: F28A NAME/CAT#: ROAD#: None WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F11, F18, F21, T4, W1, W7, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- N/A; Superstand Net Vol/ac= 14,476; Insects & Disease: Cedar Dieback- little Downhill Yarding- 90%; Windthrow risk- medium-low; Logging system Options- Helicopter; Regeneration System Options- Clearcut-typeC & Seed Tree; Site Productivity- 4M; Average Site Index (50yr)- 75
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 20 to 70 percent gradient. Forested wetlands occur on slopes less than 45 percent gradient in the unit. Use a minimum of partial suspension to keep impact to the soil and wetlands resources within standards. (BMPs 13.5, 12.5 and 13.9). Full suspension is planned. A small wetland riparian area was identified on the small stream near the southwest corner of the unit. The riparian area is outside the unit boundary. (BMP 12.6
J.Hannon	FISHERIES No Concerns...no streams.
A.Moore T.Sapozhnikova 8/20/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is no high value marten habitat in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See unit 675-028 discussion. RECREATION: Unit is located north of Sunny Cove. See visuals section for design comments related to the recreation setting, as viewed from the mouth of Sunny Cove
G. Lawton 3/00	PRESCRIPTION Even-aged clear-cut w/ reserves(type C): retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging. Type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Leave cedar trees on perimeter for seed. Estimate volume(14MBFx5). Check option: drop road to 676-472, -462, -489 & helicopter all three. Helicopter logging system is anticipated on entire unit. No high volume strata exist in unit. Deleted acres due to high MMI. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ 25+ yrs. Minimum of Partial suspension required for soil protection. Low volume poor economics. See BMPs listed above.



Cholmondeley DEIS Unit 676-484



660 0.0 660 feet



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-484 ACRES: 6 VOL: 102 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-133,4 1/4 QUAD: ELEV. RANGE: 1000 ASPECT: SW LOGGING SYSTEMS: HE

WATERSHED#: F30A,F31A NAME/CAT#: Scrubby/Barley Clover 102-50-21 ROAD#: None

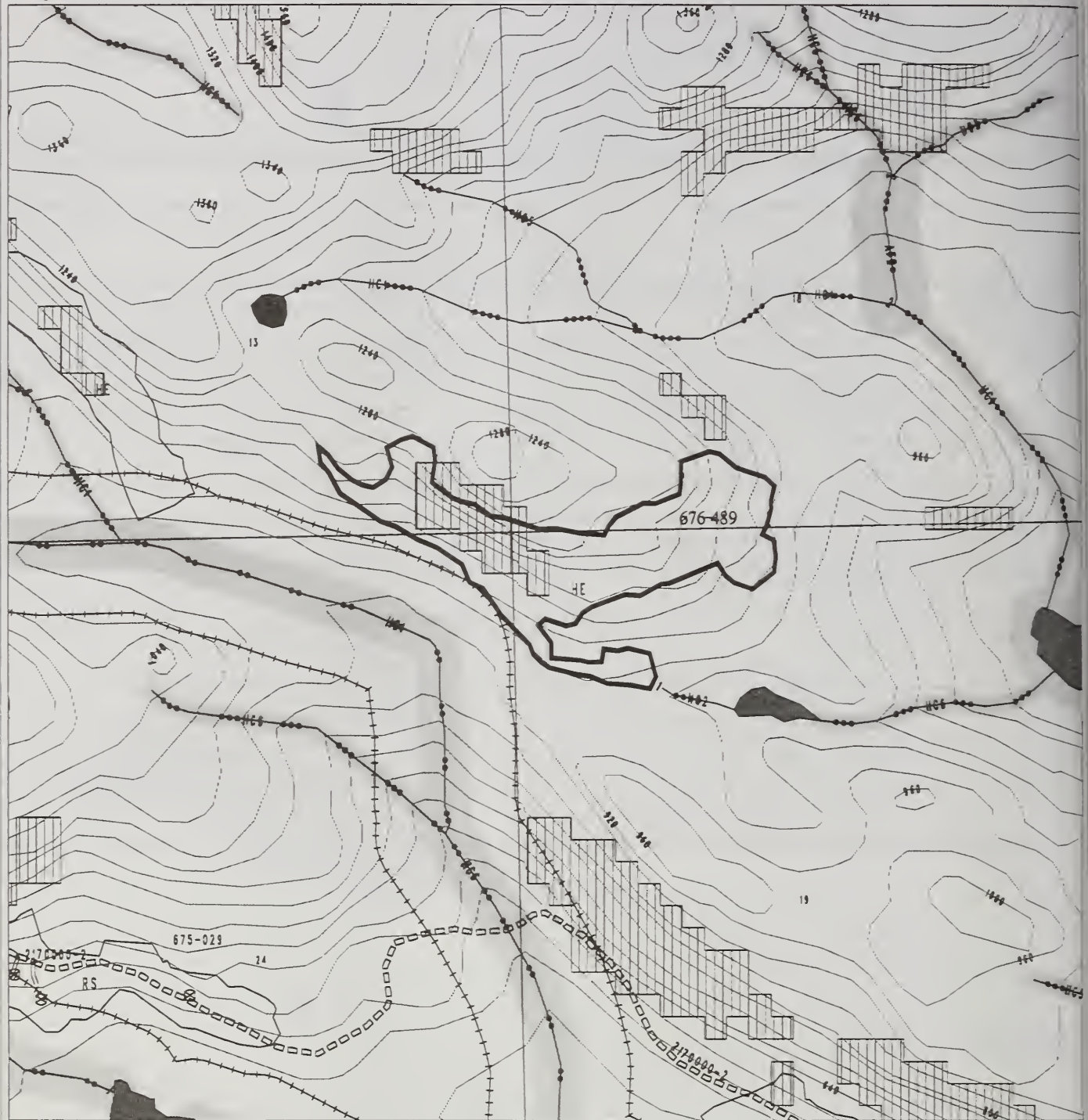
WINDTHROW RISK: Moderate

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F11, F15, F18, F21, W1, W7, W34, V1, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 35; Superstand Net Vol/ac= 31,918; Insects & Disease: n/a Downhill Yarding- n/a; Windthrow risk- medium; Logging system Options- Helicopter; Regeneration System Options- n/a; Site Productivity- 4; Average Site Index (50yr)- 75.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 60 to 90 percent gradient with an estimated 1 acres of slopes over 72 percent gradient. Use full suspension to minimize impacts to soils resources (BMP 13.5 and 13.9). The lake south of the unit and the pond east of the unit have very narrow lakeshore riparian areas that will be entirely outside the harvest unit. (BMPs 12.6, 12.6a and 13.16). See fisheries section for lake and stream protection measures.
T.Paul P.Moore 6/22/97	FISHERIES The shallow lake southwest of the unit was fished for 30 minutes, no fish were seen or caught. The unit is at least 100' from the lake. Stream #1 Class IV Flagging G/W C-type HC5. no buffer required.
M.Dillman 4/1/98 and 4/99	WILDLIFE Wildlife did not survey this unit due to the fact that it did not comply with the current goshawk protocols for slope and volume class. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is no high value marten habitat in the unit. As a clear cut with reserves about 1-2 acres should be left in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located northeast of Sunny Cove. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION Even-aged clear-cut w/ reserves(type C); retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging. Type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Leave Cedar seed trees along perimeter. Soils full suspension is required.. Helicopter logging system is anticipated on entire unit. No high volume strata exist in unit. Future activities: regeneration surveys... Low volume, poor economics. (17x6MBF) See BMPs listed above.



Cholmondeley DEIS Unit 676-489



- | | | | | |
|---------------------------|--|---|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLWP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 350-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-489 ACRES: 17 VOL: 289 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-133.4 1/4 QUAD: ELEV. RANGE: 900-1200 ASPECT: SE LOGGING SYSTEMS: HE

WATERSHED#: F28A/F30A NAME/CAT#: Drinking Water/Scrubby ROAD#: None WINDTHROW RISK: Low

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F11, F18, F20, F21, W1, W7, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- 28; Superstand Net Vol/ac= 17,761; Insects & Disease: Cedar Dieback- high, Mistletoe- little, & Rot- medium; Downhill Yarding- 90%; Windthrow risk- low; Logging system Options- Helicopter; Regeneration System Options- Clearcut-typeB & Overstory Removal- 16"; Site Productivity- 4M; Average Site Index (50yr)- 75
Jack Oien	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 80 percent gradient with an estimated 2 acres of slopes over 72 percent gradient in the northwest corner of the unit. Forested wetlands occupy 5 acres in the southeast corner of the unit. Use full suspension to minimize impacts to soil and wetland resources (BMP 12.5, 13.5 , and 13.9). There is a small wetland riparian area surrounding the pond south of the unit. (BMP 12.6). The riparian area is entirely outside the unit boundary.
J.Hannon	FISHERIES Unit not visited by fisheries. No GIS mapped streams in unit. A lake south of the unit may not be shown in GIS. Check for streams during layout and apply appropriate protection measures. BMP 12.6, 13.16
L.Mosenthin A.Moore 5/29/97 M.Dillman 4/99	
L.Mosenthin A.Moore 5/29/97 M.Dillman 4/99	WILDLIFE Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is no high value marten habitat in the unit. As a clear cut with reserves 2-4 acres should be left in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 675-028 discussion. RECREATION: Unit is located north of Sunny Cove. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves(type C):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging. Type C clear-cut would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Leave cedar trees a perimeter for seeding. Estimate volume (17MBFx17). Option: drop road to 676-472, -462, -489 & helicopter all three. Helicopter logging system is anticipated on entire unit. No high volume strata exist in unit. Future activities: regeneration surveys, yellow cedar planting, seed collection, survival survey, and pre-commercial thin @ +25yrs. Partial suspension required for soil protection. Use: 1st choice of regeneration system = clear-cut- type C, and 1st choice of logging system = Helicopter. Poor volume and economics. (17x17) See BMPs listed above.



Cholmondeley DEIS Unit 676-500



- | | | | | |
|---------------------------|--|--|---|-----------------------|
| Soilwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Cord) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes $\geq 72\%$ | Logging: Setting Boundary (See Unit Cord for Harvest System Definitions) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | Streams | AHMU 2 Stream | Proposed Landing |
| | | | | Eagle Nest |

660 0.0 660 feet

CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-500 ACRES: 9 VOL: 135 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-133,4 1/4 QUAD: ELEV. RANGE: 800-1000 ASPECT: S LOGGING SYSTEMS: HE

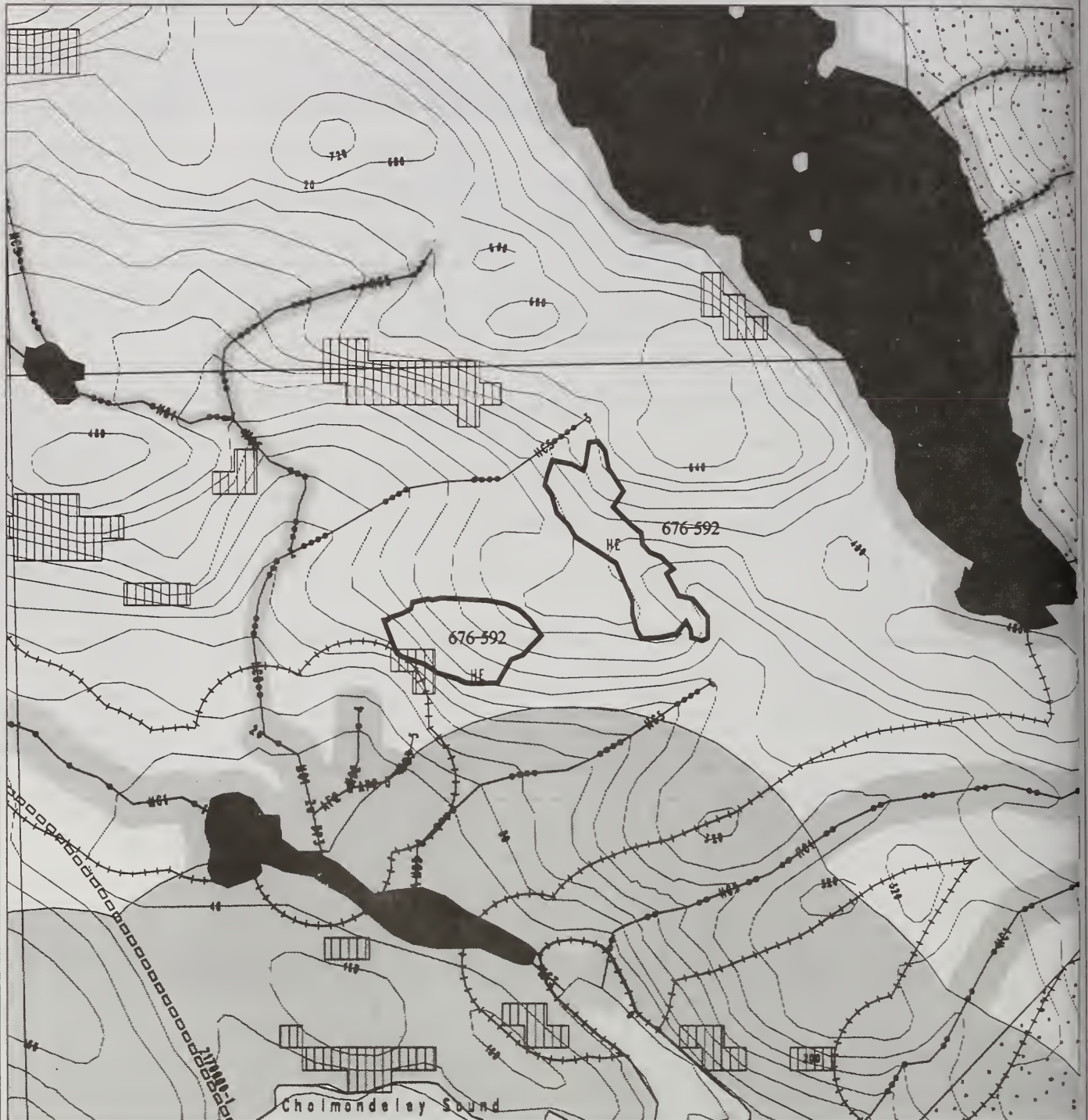
WATERSHED#: F30A NAME/CAT#: SCRUBBY ROAD#: None WINDTHROW RISK: Medium

The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F18, F20, F21, W1, W7, W34, V1, V13). These measures are described below within the resource sections that apply and correspond to Append

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- N/A; Superstand Net Vol/ac= n/a; Insects & Disease: n/a Downhill Yarding- n/a; Windthrow risk- medium; Logging system Options- Helicopter; Regeneration System Options- n/a; Site Productivity- 4; Average Site Index (50yr)- 75.
	TRANSPORTATION - SEE ROAD CARDS FOR ROADS LISTED ABOVE
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 60 percent. Use a minimum of partial suspension to minimize impacts to soil resources. (BMP 13.9). Small slope-break and wetland riparian areas occur on the streams south and west of the unit. On the western boundary the riparian area may be within the harvest unit. (BMP 12.6 and 12.6a and 13.16).
P.Moore T.Paul 6-22-97	FISHERIES The stream on the southern boundary is mapped as a class III. No fish were found upstream in the lake. The final stream classification will need to be made during layout. No streams affect unit boundaries. BMP 13.16
M.Dillman 4/1/98 and 4/99	WILDLIFE Wildlife did not survey this unit due to the fact that it did not meet current goshawk protocol guidelines. Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. There is no high value marten habitat in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: No concerns. RECREATION: Unit is located northeast of Sunny Cove. Recreation use in the vicinity of the unit is not probable.
G. Lawton 3/00	PRESCRIPTION <u>Even-aged clear-cut w/ reserves(type c):</u> retain < 15% of cutting unit or <30 CCF, where feasible and safe. Areas should be in clumps or patches, buffers or blind-leads, dispersed, and should contain large live trees and hard snags. Use: type C clear-cut, helicopter logging would leave non-merchantable trees and safe snags over the entire unit. This type of clear-cut can be used with helicopter yarding. Large snags in the center of a unit may also present a problem due to prop wash and log-line contact. Leave cedar seed trees along perimeter. Soils partial suspension is required on the entire unit. Helicopter logging system is anticipated on the entire unit. No high volume strata exist in unit. Estimate volume (9x15MBF). Future activities: regeneration surveys. See BMPs listed above.



Cholmondeley DEIS Unit 676-592



- | | | | | |
|---------------------------|--|--|---|-----------------------|
| Saltwater | Encumbered National Forest System Land | TLMP Old Growth Reserve | Project Boundary | AHMU 3 Stream |
| RMA No Cut Buffer | Second-Growth Managed Stand | Selected Unit | 300-Ft Offset From Stream | AHMU 4 Stream |
| 1000' No Cut Beach Buffer | No Cut Area (See Unit Card) | Proposed Units | Planned New Specified Road Construction | 40-Ft Contours |
| Freshwater | Slopes >= 72% | Logging Setting Boundary (See Unit Card for Harvest System Definition) | Planned New Temporary Road Construction | Log Transfer Facility |
| State & Private Land | | | Streams | Proposed Landing |
| | | | AHMU 2 Stream | Eagle Nest |

660 0.0 660 feet



CHOLMONDELEY PROJECT HARVEST UNIT DESIGN CARD (DEIS)

VCU-UNIT#: 676-592 ACRES: 9 VOL: 256 MBF ALTERNATIVES: 2,3,4,5

PHOTO YR/#: '91/490-51,52 1/4 QUAD: ELEV. RANGE: 100,200 ASPECT: SW LOGGING SYSTEMS: HE

WATERSHED#: 000Z NAME/CAT#: ROAD#: 2170100 WINDTHROW RISK: Moderate to High
The following mitigation measures were either taken during unit design or they will be applied during project implementations: (M1, M2, F3, F18, F21, W1, W7, W34, V1, V8, V13). These measures are described below within the resource sections that apply and correspond to Appendix D.

REVIEWER & DATE	RESOURCE CONSIDERATIONS/RECOMMENDATIONS
G. Lawton 9/98	SILVICULTURE/TIMBER Exam Stands- N/A; Superstand Net Vol/ac - 32,030; Insects & Disease: Cedar Dieback- high; Downhill Yarding- 20%; Windthrow risk- medium-high; Logging system Options- Helicopter, Running Skyline, & Shovel;; Site Productivity- 4; Average Site Index (50yr)- 80.
Jack Oien	TRANSPORTATION - SEE ROAD CARDS.
D.Landwehr 2/00	SOILS/WATERSHED Slopes range from 30 to 50 percent gradient. Forested wetlands occur on slopes less than about 40 percent gradient in unit 592. Use a minimum of partial suspension to minimize impacts to soil and wetland resources (BMP 12.5 and 13.9). One slope-break and one estuary riparian area occur in and adjacent to unit 592. The riparian areas will be entirely within the buffers (BMP 12.6, 12.6a and 13.16). See fisheries section for streamcourse protection measures (BMP 12.6a and 13.16).
T.Paul J.Hannon 6/17/97	FISHERIES Six flagged and tagged streams are class I below the unit. The unit boundary was moved back when it was discovered that the lakes at the bottom were actually estuary. This eliminated fish stream buffers affecting the unit and much commercial timber. Stream# <u>3</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> The stream is the northwest unit boundary. A Pacific Yew was downstream at 175' elevation. Stream# <u>6</u> Class <u>IV</u> Flagging <u>GW</u> C-type <u>HC5</u> The stream may not reach the eastern unit boundary, Pacific Yew 75' upstream of class III/IV break. No streams affect unit boundaries 9-11-99 john. BMPs 12.6, 13.16
M.Dillman 4/1/98 and 4/99	WILDLIFE Wildlife did not survey this unit due to the fact that it is small and isolated Wildlife recommends leaving live reserve trees and snags where possible to maintain habitat structure and snag density. No high value marten habitat exists in the unit.
T.Fifield 10/18/98 J.Short J.Kluwe	GEOLOGY/MINERALS: LANDS: No concerns. CULTURAL: Low sensitivity unit as defined in 95 SHPO PMOA (#95-MOU-10-029). Unit not selected for survey. No concerns. VISUALS: See Unit 675-028 discussion. RECREATION: Unit is located east of Sunny Cove. See visuals section for design comments related to the recreation setting, as viewed from the mouth of Sunny Cove. Timing harvest/yarding activities outside the primary recreation use season (5/20-9/10) would reduce impacts to recreation activities in the area.
G. Lawton 11/99	PRESCRIPTION <u>Even-aged clear-cut w/ reserves(type B):</u> retain < 45% of cutting unit or <30 CCF, where feasible and safe. Type B clear-cut calls for a specified number (~25 trees per acre) of snags and live replacements with 20"diameter limit retained in 50 to 100 feet of the border. Partial suspension is required for soils protection on the SW 1/3. No high volume strata exist in unit. Yarding system difficulties due to: rock knobs. Check option to drop road and helicopter yard the unit. Estimate volume = (16x30)-0. Future activities: regeneration surveys. Unit near 1000' buffer. (32x8) See BMPs listed above.



Appendix C

Road Cards

3. 11. 1950

1950

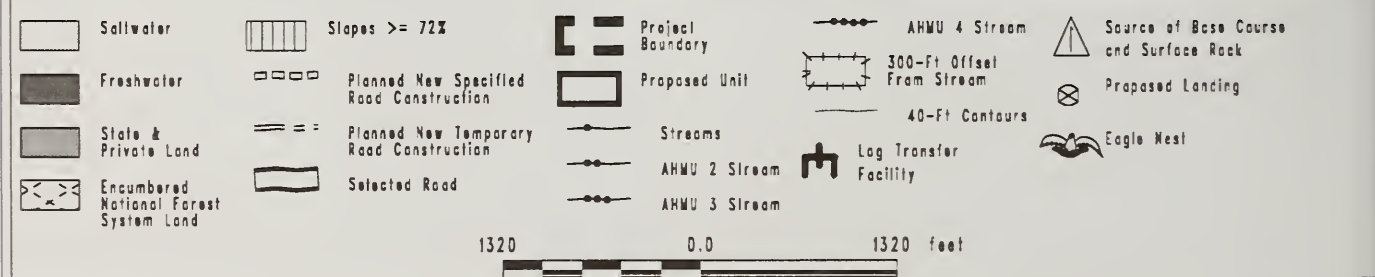
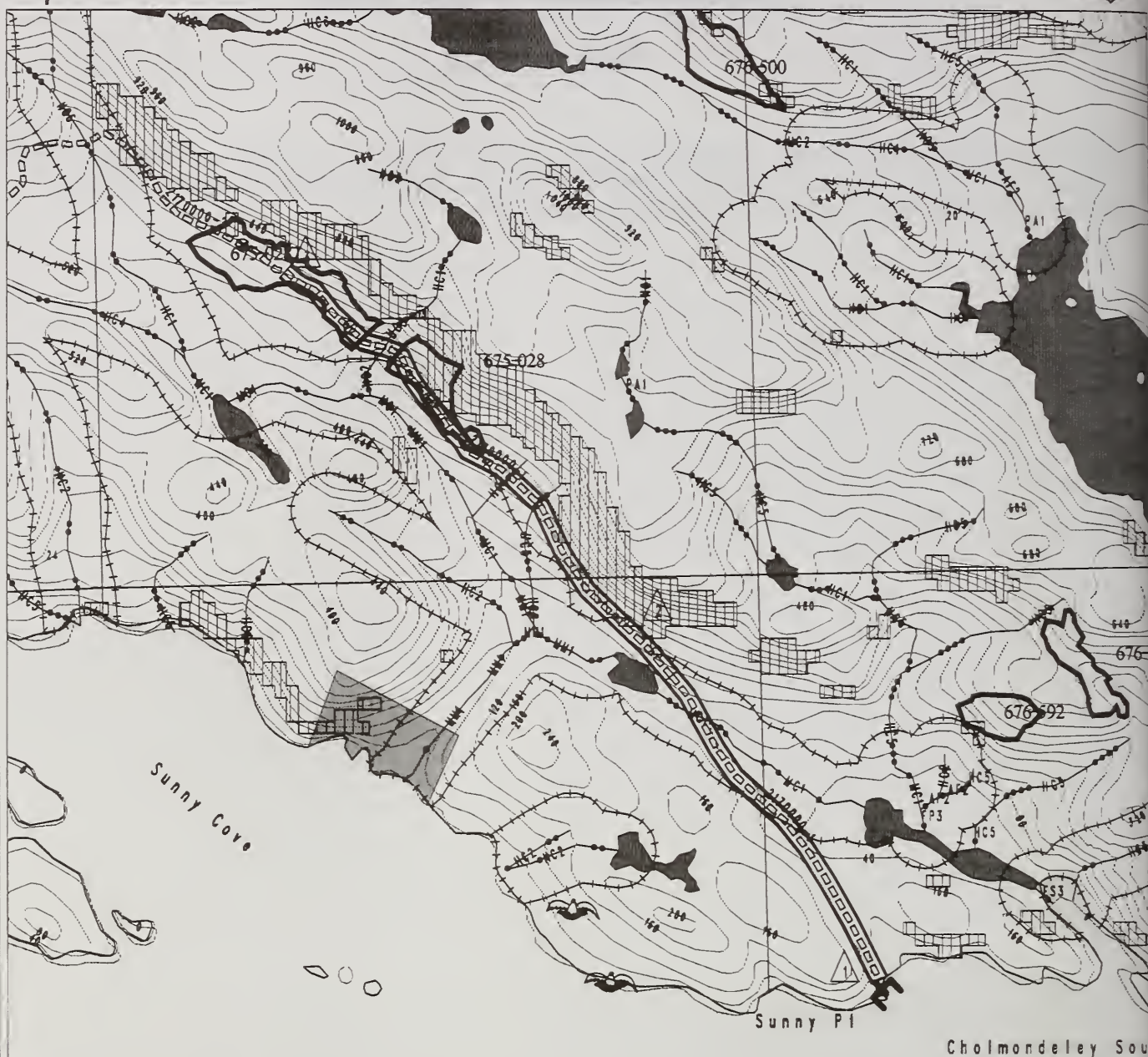
Cholmondeley Timber Sales

Road Cards

The road cards provide a summary of information about individual proposed or existing roads which are included in one or more alternatives. They display site-specific information such as additional mitigation measures, observations, and need for further assistance during field layout.



Cholmondeley DEIS Road No. 2170000-1



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2170000-1	Route Name Lybrandberry Lane	Status New Construction
Begin M.P. 0.00	Length (miles) 1.43	Begin Termini 0.00
		End Termini 1.43

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities. Road to be open to administrative use only, all other motorized vehicle traffic will be prohibited by closure order..

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: install drivable waterbars at 500-foot intervals after initial silvicultural activities are complete. Maintain at ML1

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: Inactive
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Travel Management Strategies

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	Motorized vehicles
Eliminate	Passenger vehicles

Travel Management Narrative: Use by trucks is expected to be minimal for silvicultural purposes with occasional use by all terrain vehicles. This road system is not connected to any public or community road systems or to any ferry system terminal. Road system to be closed to motorized vehicles after initial entry. After silvicultural activities are completed (3-4 years after completion of initial sale) road will have all drainage structures removed and road put into storage (AFRPR status of closed).

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2170000-1

Road Location: Road access units 675-027 & 028 . LTF will require sortyard area(3-5 acres) +/- 1000 feet from LTF, numerous non-wetland areas available. Grades are favorable to 12%, construction difficulty is easy to moderate. Location controlled by stream crossing along route, high value wetlands avoidance and avoidance of impacts on private water system. LTF location will need to maintain the minimum 330-foot buffer on eagle nests.

Wetlands: Road location was completed to avoid wetlands wherever practicable. Wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources. Alternatives to the location on wetlands would mean longer, higher cost roads that may have impacted similar areas of wetlands. High value wetlands (fens) were particularly avoided wherever practicable. Area in forested wetlands m.p. 0.3 to 0.5 is unavoidable due to stream crossing location and to reduce total roading miles. Other wetland areas crossed from m.p. 0.9 to m.p. 1.75 are controlled by topography and grade restrictions and other resource concerns.

Erosion Control:

Rock Pits: As shown on map, no major concerns. Rock source will be required near the LTF site. Timing will be required on all blasting within one half mile of known eagle nests

Resource Information (If applicable):

Timber/Logging: High probability of salvage timber remaining after initial entry.

Soils/Water: The proposed route traverses 10 to 40 percent sideslopes to access units 675-027 and 028 from the LTF. Cedar-hemlock-blueberry forested wetlands are crossed for about 75 percent of the proposed route. The wetlands occur mostly on sideslopes of small hills and serve to store and transfer water downslope. Wetlands occupy nearly all sites except extremely steep slopes and beachside areas. Avoidance while accessing the proposed harvest units is impossible without impacting more sensitive areas like lakes, streams and estuaries. (BMPs 14.2 and 12.5) Helicopter yarding is considered under alternative 2 in this EIS. At approximately mile post 0.5 the location enters the Drinking Water Creek Watershed, so named because it is a domestic water source for Sunny Cove Residents. Timing will be required to reduce erosion potential (BMP 14.6). An erosion control plan that adequately addresses drinking water concerns, will need to be developed during the plan-in hand review. (BMPs 14.6, 14.7, 14.8, 14.9, 14.11, 14.12, and 14.14). The erosion control plan should include mitigation such as installation of settling ponds at stream crossings, riprap and erosion control fabric at stream crossings, timing so work only takes place during low flow conditions, and use of portable toilets inside the Watershed. Control of road drainage will be critical as the road location parallels the stream and is within 200 feet of the stream for much of it's length. Rock pits should not be located in the Drinking Water Watershed (BMPs 14.2, 14.8, 14.12, and 14.25). A rock pit in wetlands will likely be necessary (BMPs 12.5 and 33 CFR BMP 8). Apply 33 CFR BMPs 2, 4, 5, 6, 8, 11 and 14. Fuel storage and refueling equipment will need to be located outside the Drinking Water Watershed (BMP 12.8). Although this road is intended to stay open, the anticipated future use is limited to silvicultural activities and incidental use by ATVs. This road meets the silvicultural exemption from the 404 permitting process. Other options for mitigating sediment inputs to the drinking water system include capping the water system intake pipe during construction, and helicopter yarding the entire group of Sunny Cove units.

Road Management Objectives

Silviculture: Road No. 217000-1 provides easy short access to units 675-027 and 675-028. Potential for 5 ac. of release and 17 acres of PCT in 25+ years are planned for unit 675-027. Potential for 23 ac. of PCT in 25+years are planned for unit 675-028.

Wildlife/Botany: There are two bald eagle nest trees in the area of the LTF for this road. Nest #66 is approximately five mile to the west and # 65 about .5 mile to the east. Maintain the minimum 330' buffer around both nests. Road building and LTF construction must be done in accordance with the requirements of the Bald Eagle Protection Act, and must comply with the MOU between the FS and USFWS. Written coordination must be documented. *Taxus brevifolia*, the Pacific yew, was also reported in the vicinity of this road at the east end of unit 675-028. Pacific yew trees are protected under the Pacific Yew Tree Act of 1992. This act states that; A) Inventory and maintain existing populations of Pacific yew trees, 1) Locate and document the location of any existing plants during Forest Service project activities, B) If found, implement site-specific silvicultural prescriptions to maintain Pacific yew's regeneration capabilities and presence on the site, and C) Retain Pacific yew during timber stand improvement activities such as precommercial thinning where ever feasible (TLMP Forest-Wide Standards and Guidelines chapter 4, page 95). Coordinate final road location to avoid sensitive plant populations where feasible. Unit 675-027 was dropped at the April IDT meeting.

Lands/Minerals/Geology/Karst:

Visual/Recreation: At LTF, retain as much vegetative buffer as possible around edge of site including between log transfer ramp and ramp to boat dock. After harvest activities are complete re-contour operating area as much as possible and re-vegetate with native vegetation.

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2170000-1

The road passes through the Sunny Cove domestic water supply watershed. Avoid road construction activities within the watershed during very wet periods.

The road parallels a small lake on the east side of the drinking water watershed. The lake has a high cutthroat population. Try to keep the road clearing limits at least 100' back from the lake if the slopes allow.

A.) M.P. 0.45 AHMU Class II Channel Type: MC1 BF Width: 1.5m BF Depth: 20cm Substrate: cobble
Gradient 5 % Structure 1500mm cmp Passage Req'd.: Yes Timing Dates: 6/1-8/7

Narrative: Crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 feet. Pink salmon stream.

B.) M.P. 0.75 AHMU Class III Channel Type: HC5 BF Width: 1m BF Depth: 15cm Substrate: bdrk
Gradient: 10 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative: Stream is part of drinking water watershed. This stream had a landslide come through about 10 years ago. Use an oversized culvert and limit culvert installation to periods of low stream flow.

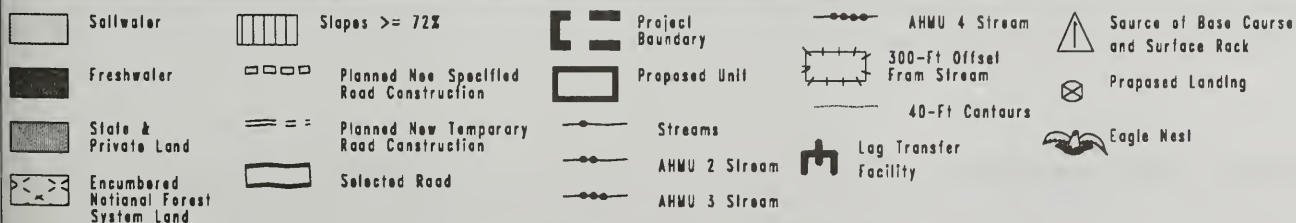
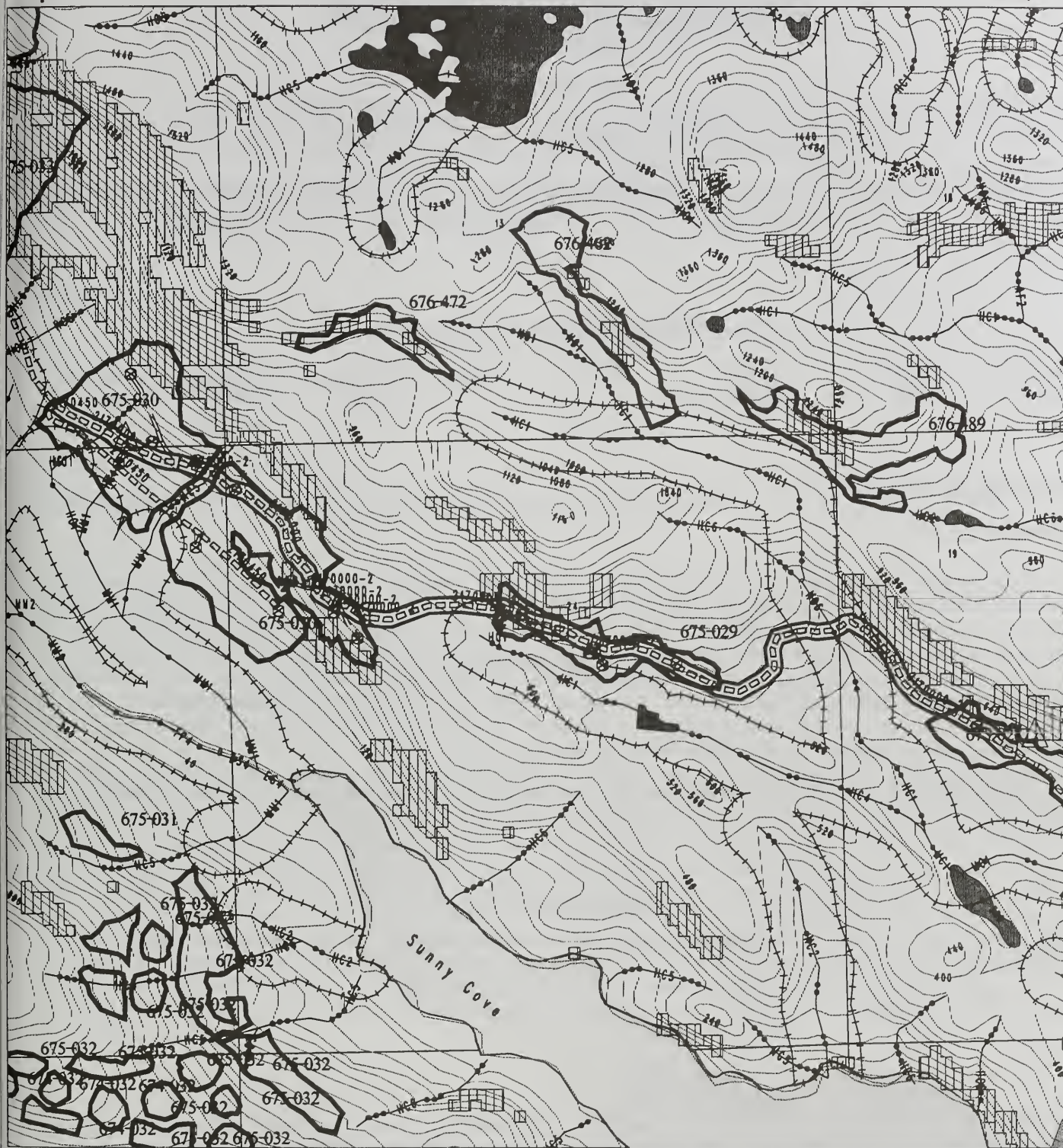
C.) M.P. 0.90 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 20cm Substrate: bdrk
Gradient 15 % Structure: 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative: Part of drinking water watershed--use an oversized culvert and limit culvert installation to periods of low streamflow.

D.) M.P. 1.20 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 30cm Substrate: bdrk

Gradient 15 % Structure: 600mm cmp Passage Req'd. No Timing Dates none

Narrative: Part of drinking water watershed--use an oversized culvert and limit culvert installation to periods of low streamflow.



1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2170000-2	Route Name Lybrandberry Lane	Status New Construction
Begin M.P. 1.43	Length(miles) 1.91	Begin Termini 1.43
		End Termini 3.34

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: install drivable waterbars at 500 foot intervals after initial silvicultural activities are complete. Maintain at ML1

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: Inactive
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	Motorized vehicles
Eliminate	Passenger vehicles

Travel Management Narrative: Use by trucks is expected to be minimal for silvicultural purposes with occasional use by all terrain vehicle. This road system is not connected to any public or community road systems or to any ferry system terminal. Road system to be closed to motorized vehicles after initial entry. After silvicultural activities are completed (3-4 years after completion of initial sale) road will have all drainage structures removed and road put into storage (AFRPR status of closed).

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2170000-2

Road Location: Road access units 675-029 & 030, road construction should be moderate to easy over most portions of the road. Road crosses some areas(m.p. 0.90) of sideslopes exceeding 67% by utilizing existing benches

Wetlands: Road location was completed to avoid wetlands(see map) although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: High probability of salvage timber remaining after initial entry.

Soils/Water: The proposed route traverses forested wetlands and scrub-shrub cedar-hemlock-blueberry-skunk cabbage forested wetlands on slopes up to 40 percent gradient for the first mile of the proposed route. The road accesses units 675-029 and 030. Uplands occur on slopes greater than about 45 percent gradient in units 029 and 030. The first 3/4 mile of the route is located in the Drinking Water Watershed. The wetlands occur on sideslopes and footslopes and serve to store and transfer water to downslope resources. The wetlands are unavoidable while providing access to the harvest units. (BMP 12.5 and 14.2). Helicopter yarding is considered in a alternative 2 in this EIS. Within the Drinking Water Watershed use BMPs 12.8 to require storage and refueling of vehicles outside the watershed. During a plan-in-hand review use BMPs 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, 14.14, and 14.19 to minimize sediment inputs to surface waters. Timing of construction activities during low flow and non-rainy periods should be considered. Rock pits need to be located outside the Drinking Water Watershed (BMP 14.8). Control of sidecast and runoff will be critical to keeping waters clean given the close proximity of the road to the stream. (BMP 14.12 and 14.18). Road maintenance (BMP 14.20) and timing of haul (BMP 14.6) may be necessary during hauling of logs to prevent runoff from entering the stream. The last 0.4 miles of the 2170000-2 road traverses slopes up to 70 percent gradient on uplands in the Sunny Creek Watershed. The soils along the proposed route are fairly landslide prone. Use full bench and end-haul construction when sideslopes exceed 55 percent gradient, especially where the road contours in and out of two streams in unit 675-030 (BMP 14.7). End-hauled material will likely have to be disposed of in wetlands south of the unit. Rock pits and end-haul sites should be located outside of the Drinking Water Watershed. Fish timing is required on these crossings. Use additional timing restrictions if necessary to prevent construction during wet weather. (BMP 14.6). A soil scientist should be involved in a plan-in-hand review of this road to apply appropriate mitigation on the final location. (BMPs 14.2, 14.7, 14.6, 14.8, 14.9, and 14.11). Apply 33 CFR BMPs 2, 4, 5, 6, 8, 11, and 14.

Road Management Objectives

Soils/Water: Road No. 217000-2 will provide short access to units 675-029 and 675-030. A potential release of 10 ac. and 29 ac of PCT in 25+ years are planned for unit 675-029. Potential for 25 ac. of release and 51 ac. of PCT in 15-20 years is planned for 675-030.

Silviculture: Road No. 217000-2 provides access to units 675-030 and 675-029. Potential for 25 ac. of release and 51 acres of PCT in 15-20 years are planned for unit 675-030. Potential for 10 ac. of release and 28 ac. of PCT in 25+years are planned for unit 675-029.

Wildlife: Several populations of the sensitive plant species *Plantanthera chorisiana* were along or near the planned road location. The road runs along the footslope through many wetland and forest edge habitats and crosses numerous small streams. All these habitats support populations of the sensitive orchid. The most effective way to avoid impacting these populations would be to relocate the road further upslope and into a more well drained area. Coordinate final road location to avoid sensitive plant populations where feasible.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

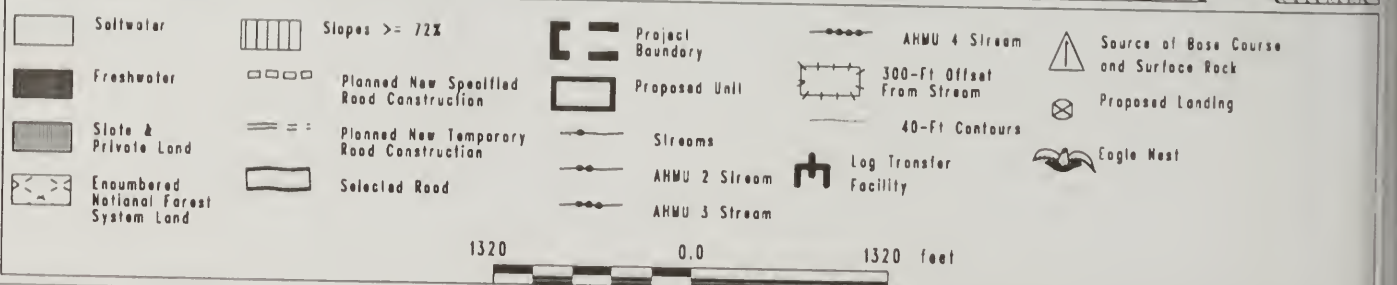
Road No. 2170000-2

A.) M.P. 0.00 AHMU Class II Channel Type: HC6 BF Width: 1.1m BF Depth 20cm Substrate: bdrk
Gradient 14 % Structure: 1200cmp Passage Req'd.: Yes? Timing Dates : none
Narrative: Part of drinking water watershed--use an oversized culvert and limit culvert installation to periods of low streamflow. Stream empties into small lake before proceeding downstream. Review in field to determine fish passage requirements depending on final road location.

B.) M.P. 0.75 AHMU Class IV Channel Type: HC5BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient : 17 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none
Narrative:

C.) M.P. 1.20 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 20cm Substrate: bdrk
Gradient 15 Structure 1500mm cmp Passage Req'd.: No Timing Dates: 6/15 - 8/7
%
Narrative: Recommend timing for pink, chum, and coho salmon 6/15 - 8/7.

D.) M.P. 1.30 AHMU Class IV Channel Type: HC5BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient : 17 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none
Narrative:



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2170000-3	Route Name Lybrandberry Lane	Status New Construction
Begin M.P. 3.34	Length(miles) 0.72	Begin Termini 3.34
		End Termini 4.06

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: install drivable waterbars at 500 foot intervals after initial silvicultural activities are complete. Maintain at ML1

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: Inactive
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	motorized vehicles
Eliminate	Passenger vehicles

Travel Management Narrative: Use by trucks is expected to be minimal for silvicultural purposes with occasional use by all terrain vehicle. This road system is not connected to any public or community road systems or to any ferry system terminal. Road system to be closed to motorized vehicles after initial entry. After silvicultural activities are completed (3-4 years after completion of initial sale) road will have all drainage structures removed and road put into storage (AFRPR status of closed).

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2170000-3

Road Location: Road access units 675-033, 037, road construction should be moderate to easy over most portions of the road. Unit 037 access is for helicopter landing only.

Wetlands: Road location was completed to avoid wetlands there were no mapped wetlands along this location.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: High probability of salvage timber remaining after initial entry.

Soils/Water: The proposed route traverses footslopes and valley sideslopes up to 50 percent gradient along Sunny Creek to access units 675-033 and 037. The proposed route crosses numerous streams (See the stream crossing report). The route also crosses a complex of forested wetlands and uplands. The wetlands occur as stringers and blobs of poorly drained soils interspersed in a matrix of upland soils. The wetlands occur on mountain sideslopes and serve to transfer water downslope. A route located higher on slope could have avoided most of the wetlands but sideslopes exceed 70 percent. (BMP 14.2, 12.5 and 33 CFR BMP 1). Helicopter yarding is considered under alternative 2 in this EIS. Landslide potential is moderate on most of the route (BMP 14.7). Opportunities for erosion will occur mostly at the stream crossings. Use BMPs 14.12, 14.18, and 14.9 to control placement of sidecast material and to control runoff from rock pits along this route. Apply 33 CFR BMPs 2, 4, 8 and 14 to minimize impacts to wetland resources. The 2170-3 meets the requirements for the silvicultural exemption from the 404 permitting process.

Silviculture: Road No. 2117000-3 provides short access to units 675-030, 675-033 and 675-037. Unit 675-030 has potential for 25 acres of release and 51 acres of PCT in 15-20 years. There is potential for 58 acres release and 100 ac of PCT in 15-20 years in unit 675-033. There is potential for 25 acres of release for unit 675-037.

Wildlife/Botany: A population of the sensitive orchid *Platanthera chorisiana* was found below the road outside the unit boundary of 675-030. This population is protected by the buffer on Sunny Creek.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2170000-3

A.) M.P. 0.20 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient 35 Structure: 900mm cmp Passage Req'd.: No Timing Dates: 6/15 - 8/7
%

Narrative: Recommend timing for pink, chum, and coho salmon 6/15 - 8/7. Strm #33-14

B.) M.P. 0.25 AHMU Class IV Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: bdrk
Gradient: 35 % Structure 600mm cmp Passage Req'd.: No Timing Dates: 6/15-8/7
Narrative: Strm #33-13.

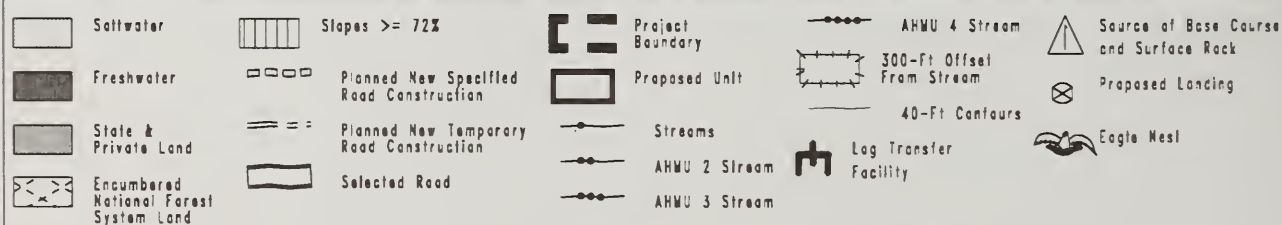
C.) M.P. 0.30 AHMU Class IV Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: bdrk
Gradient: 35 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none
Narrative: Strm #33-12.

D.) M.P. 0.30 AHMU Class IV Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: Gr,Cb
Gradient 25 Structure: 600mm cmp Passage Req'd.: No Timing Dates: 6/15 - 8/7
%
Narrative: Strm #33-11. road crosses stream at small slide.

E.) M.P. 0.40 AHMU Class IV Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: Gr,Cb
Gradient: 30 % Structure 600mm cmp Passage Req'd.: No Timing Dates: 6/15-8/7
Narrative: Strm #33-9. Timing for coho, pink, chum in Sunny Cr.

F.) M.P. 0.50 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 10cm Substrate: Gr,Cb
Gradient 30 Structure: 900mm cmp Passage Req'd.: No Timing Dates: none
%
Narrative: Recommend timing for coho, pink and chum salmon 6/15 - 8/7. Strm #33-7

G.) M.P. 0.60 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 20cm Substrate: Cb,Bd
Gradient: 25 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none
Narrative: Strm #33-4.



1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2170450	Route Name Poison Oak	Status New Construction
Begin M.P. 0.00	Length(miles) 0.52	Begin Termini 0.00
		End Termini 0.52

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	motorized vehicles
Eliminate	Passenger vehicles

Travel Management Narrative: Use by trucks is expected to be minimal for silvicultural purposes with occasional use by all terrain vehicle. This road system is not connected to any public or community road systems or to any ferry system terminal. Road system to be closed to motorized vehicles after initial entry. After silvicultural activities are completed (3-4 years after completion of initial sale) road will have all drainage structures removed and road put into storage (AFRPR status of closed).

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2170450

Road Location: Road access unit 675-030, road construction should be moderate to easy over most portions of the road. Some rock excavation thru small rock outcrops.

Wetlands: Road location was completed to avoid wetlands, there were no wetlands mapped for this road location.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information(If applicable):

Timber/Logging: No post-sale activities planned for this unit.

Soils/Water: The proposed route traverses 20 to 40 percent slopes on the mountain footslope. The route is located within unit 675-030 to provide access to an area isolated from the 2170 road by a cliff. The route crosses minor areas of forested wetlands and three water quality streams within the unit. Landslide potential is moderate on most of the route (BMP 14.7). Opportunities for erosion will occur mostly at the stream crossings. Use BMPs 14.12, 14.18, and 14.9 to control placement of sidecast material and to control runoff from rock pits along this route.

Silviculture: Road number 2170100 provides access to unit 676-592.

Wildlife/Botany: No real concerns.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2170450

A.) M.P. 0.10 AHMU Class III Channel Type: HC5 BF Width: 0.4m BF Depth: 10cm Substrate: bdrk
Gradient 12 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none
%

Narrative:

B.) M.P. 0.17 AHMU Class III Channel Type: HC5 BF Width: 0.4m BF Depth: 15cm Substrate: bdrk
Gradient: 12 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none

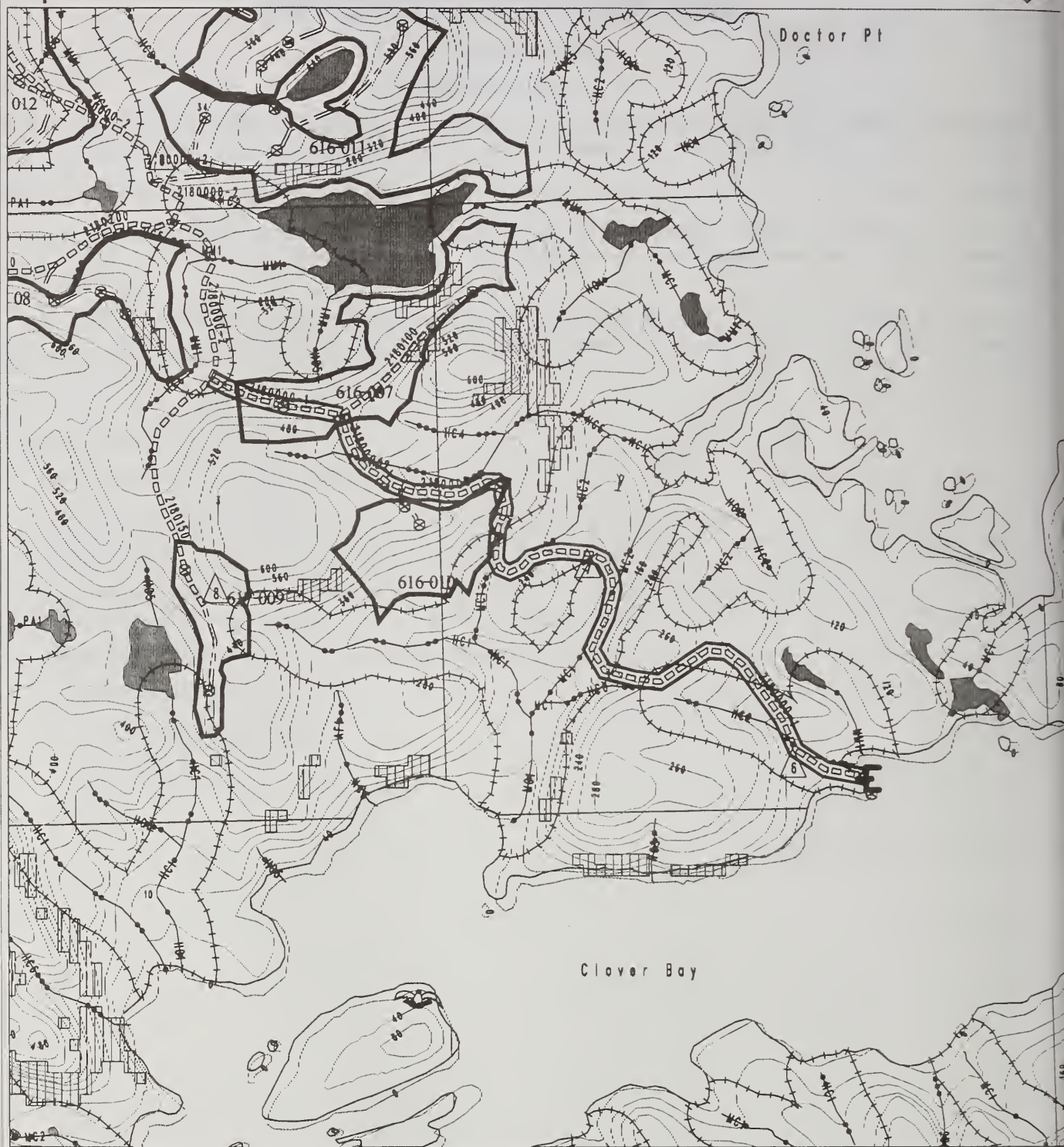
Narrative:

C.) M.P. 0.29 AHMU Class III Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: bdrk
Gradient 15 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

Narrative:



Cholmondeley DEIS Road No. 2180000-1



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes >= 72% | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180000-1	Route Name Clover	Status New Construction
Begin M.P. 0.00	Length(miles) 1.65	Begin Termini 0.00 LTF
		End Termini 1.65

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: Water bar road every 500 feet and or at critical areas.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: inactive
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles, ORV's
Discourage:	Motorized vehicles
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road to be put in storage upon completion of harvest and silvicultural activities (3-4 years).

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180000-1

Road Location: Road accesses unit 617-007, 616-010, road construction should be moderate to easy over most portions of the road. Road located to accommodate logging systems and still have least impact on the other resources. M.P. 0.75 thru 0.95 has some sections of steep slopes over 67% where road location goes from bench to bench. Road provides access to proposed LTF in Clover Bay.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information(If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: The proposed route accesses unit 617-009 from the LTF through cedar-hemlock-blueberry-skunk cabbage forested wetlands on slopes less than 40 percent gradient and uplands on slopes up to 70 percent gradient. The forested wetlands are on sideslopes and topographic summits of low, bedrock controlled hills. Most soils are less than 40 inches thick and serve to store water and donate water to downstream resources. A small portion of this road traverses the upper reaches of a small watershed (F40A) that serves as a domestic water supply to Clover Bay Lodge. Considering the location of the road and the gentle slopes, standard construction techniques should be adequate to protect the water supply (BMPs 14.2, 14.3, 14.8, 14.9, and 14.11). No rock pits or fuel storage should be located in watershed F40A (BMPs 14.8 and 12.8). The 2180-1 road is planned for inactive status. Incidental use by ATVs is anticipated. The 2180 road meets the requirements for the silvicultural exemption from the 404 permitting process. Apply 33 CFR BMPs 2, 4, 5, 6, 8, 11, and 14. A rock pit may need to be located in wetlands, as alternative upland sites are on steep slopes with higher erosion potential and difficult operating conditions (33 CFR BMP 8). Helicopter yarding is considered under alternative 2 and 3 in this EIS.

Silviculture: Road No. 2180000-1 provides short access to units 617-009 and 616-010. Unit 617-009 has potential for 5 acres of planting and 15 acres of PCT in 25+ years. There are no proposed post harvest activities planned in unit 616-010.

Wildlife/Botany: No real concerns. LTF should be far enough from the bald eagle nest not to require any timing restrictions. If the units in the area are helicoptered the flight path may require timing, due to the eagle nests in the vicinity, depending on the location of the drop zone.

Lands/Minerals/Geology/Karst:

Visual/Recreation: Along this road care should be taken to design rockpits in a way that blend into the terrain .Avoid square, blocky configurations. Design walls to blend as much as possible into natural slopes such as by tapering walls gradually into road alignment. Floors of rockpits should be re-contoured to some degree with stock-piled overburden. Rockpit floors and benches should be re-vegetated. Rehabilitation plan will identify how floor is to be re-contoured and specify type of vegetation. At LTF maintain as much vegetative buffer as possible between ramp and saltwater, and between operating area and saltwater. After harvest activities are complete, re-contour disturbed areas as much as possible and re-vegetate with native vegetation

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180000-1

Road passes through the domestic water supply watershed for Clover Bay Lodge. Avoid road construction activities within the watershed during very wet periods if the lodge is anchored in Clover Bay.

A.) M.P. 0.20 AHMU Class II Channel Type:HC2 BF Width: 1.3m BF Depth: 20cm Substrate: bdrk
Gradient 10 Structure: 900mm cmp Passage Req'd.: Yes Timing Dates: none
%

Narrative: Stream not checked for fish, need to verify class after final road location complete.

B.) M.P. 0.75 AHMU Class I Channel Type:MC1 BF Width: 1m BF Depth: 20cm Substrate: bdrk
Gradient: 5 % Structure 900mm cmp Passage Req'd.: Yes Timing Dates: none

Narrative: Stream not field checked for fish. Need to verify class and passage requirements after final road location complete.

C.) M.P. 1.15 AHMU Class III Channel Type:HC2 BF Width: 0.4m BF Depth: 8cm Substrate: bdrk
Gradient: 15 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative: Stream not field checked for fish. Need to verify class and passage requirements after final road location complete.



Cholmondeley DEIS Road No. 2180000-2



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes $\geq 72\%$ | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180000-2	Route Name Clover	Status New Construction
Begin M.P. 1.65	Length(miles) 1.54	Begin Termini 1.65
		End Termini 3.19

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: Water bar road every 500 feet and or at critical areas.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: inactive
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles, ORV's
Discourage:	Motorized vehicles
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete in area beyond unit 616-008.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180000-2

Road Location: Road accesses unit 617-008, 616-012, road construction should be moderate to easy over most portions of the road. Road located to accommodate logging systems and still have least impact on the other resources. No areas with consistent sideslopes of 67% or greater or unstable soils. Road location is at the base of the steep areas in the section of road West of unit 616-012. Due to change of OGR area after initial recon the OGR area now encroaches on the road R/W. The road that the OGR encroaches on will be closed after all harvest activities are complete with all drainage structures being removed.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources. High value portions of wetlands between units 012 and 008 were avoided.

Rock Pits: As shown on map, no major concerns.

Resource Information(If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: About 50 percent of the proposed route crosses forested wetlands and scrub-shrub evergreen wetlands on slopes less than 50 percent gradient. The wetlands are unavoidable as nearly all the areas between harvest units and some harvest units are on wetlands. (BMP 12.5, 14.2, and 33 CFR BMP 1). Helicopter yarding is considered under alternative 2 in this EIS. The wetlands lie on sideslopes of small hills and footslopes and serve to donate and transfer water to downslope resources. The road can be mostly overlay construction in the wetland areas. The very north end of this road segment skirts a tall sedge fen and floodplain riparian area. The riparian area is around a small pond that discharges to a single stream (Monie Creek). Use BMPs 12.5, 14.12 and 14.19 to keep excavated material out of this higher value wetland. Use BMP 14.8 and 33 CFR BMP 8 to locate a rock pit in an upland area. Apply 33 CFR BMPs 2, 4, 5, 6, 7, 8, and 14. The 2180-2 is planned for inactive status. The 2180-2 road meets the requirements for the silvicultural exemption from the 404 permitting process.

Silviculture: Road No. 2180000-2 provides short access to units 616-006, 616-012 and 617-009. Unit 616-006 has no planned post harvest activities planned. Unit 616-012 has potential for 5 acres of planting and 51 acres of PCT in 20-25 years. Unit 617-009 has 5 acres of planting and 15 acres of PCT in 25+ years planned..

Wildlife/Botany: A small section of the road goes near a biologically sensitive wetland at the southeast corner of unit 616-012. This wetland contains numerous sensitive, rare and unusual plants. The species found included *Utricularia intermedia*, *Potamogeton gramineus*, *Ranunculus flammula* var. *filiformis*-a fresh water sponge, *Lycopus uniflorus*, *Carex buxbaumii*, *Malaxis paludosa*, *Platanthera chorisiana*, and *Botrychium multifidum*. The sensitive plant species *Senecio moresbiensis* was located in the medium-tall sedge margin of this fen. The site is flagged on a nearby tree as the area itself is a treeless microsite. All of these plants as well as the populations are small and easily destroyed. The area itself is now located outside of unit 616-012 and the road location has been moved to skirt around the eastern edge of the fen. The current road location crosses the small creek which drains from the fen into Monie Lake. This creek supports a large population of the sensitive plant *Platanthera chorisiana*. This stream is being crossed with a bridge and has a 200 foot buffer on it. These measures should protect the plant populations. The area of the fen itself however has been frequently used as a helicopter landing site. It is recommended that in the future this location be avoided in favor of alternative less sensitive helispots. The fen, associated creeks and small lake should also be avoided during timber harvest, road location and not used as a staging areas.

Road Management Objectives

Lands/Minerals/Geology/Karst:

Visual/Recreation: Along this road care should be taken to design rockpits in a way that blend into the terrain. Avoid square, blocky configurations. Design walls to blend as much as possible into natural slopes such as by tapering walls gradually into road alignment. Floors of rockpits should be re-contoured to some degree with stock-piled overburden. Rockpit floors and benches should be re-vegetated. Rehabilitation plan will identify how floor is to be re-contoured and specify type of vegetation.

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180000-2

A.) M.P. 0.20 AHMU Class II Channel Type:MM1 BF Width: 1.5m BF Depth: 20cm Substrate: cobble
Gradient 5% Structure: 1800mm cmp Passage Req'd.: Yes Timing Dates: none

Narrative: Crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 ft. Most likely a 1500 - 1800 mm diameter culvert. Road crossed just below the jct. of class III and class II stream so only one crossing will be required(contrary to what is shown on the map).

B.) M.P. 0.45 AHMU Class II Channel Type:MC1 BF Width: 4m BF Depth: 0.5m Substrate: bdrk
Gradient : 8% Structure Bridge Passage Req'd.: Yes Timing Dates: 6/15 - 9/1

Narrative: main stream draining lakes above recommend a small(40') bridge , good approaches and stable banks for spread sill footing. Timing is for coho and sockeye in Monie Lake.

C.) M.P. 0.95 AHMU Class IV Channel Type:HC6 BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient 15+% Structure: 450mm cmp Passage Req'd.: No Timing Dates: none

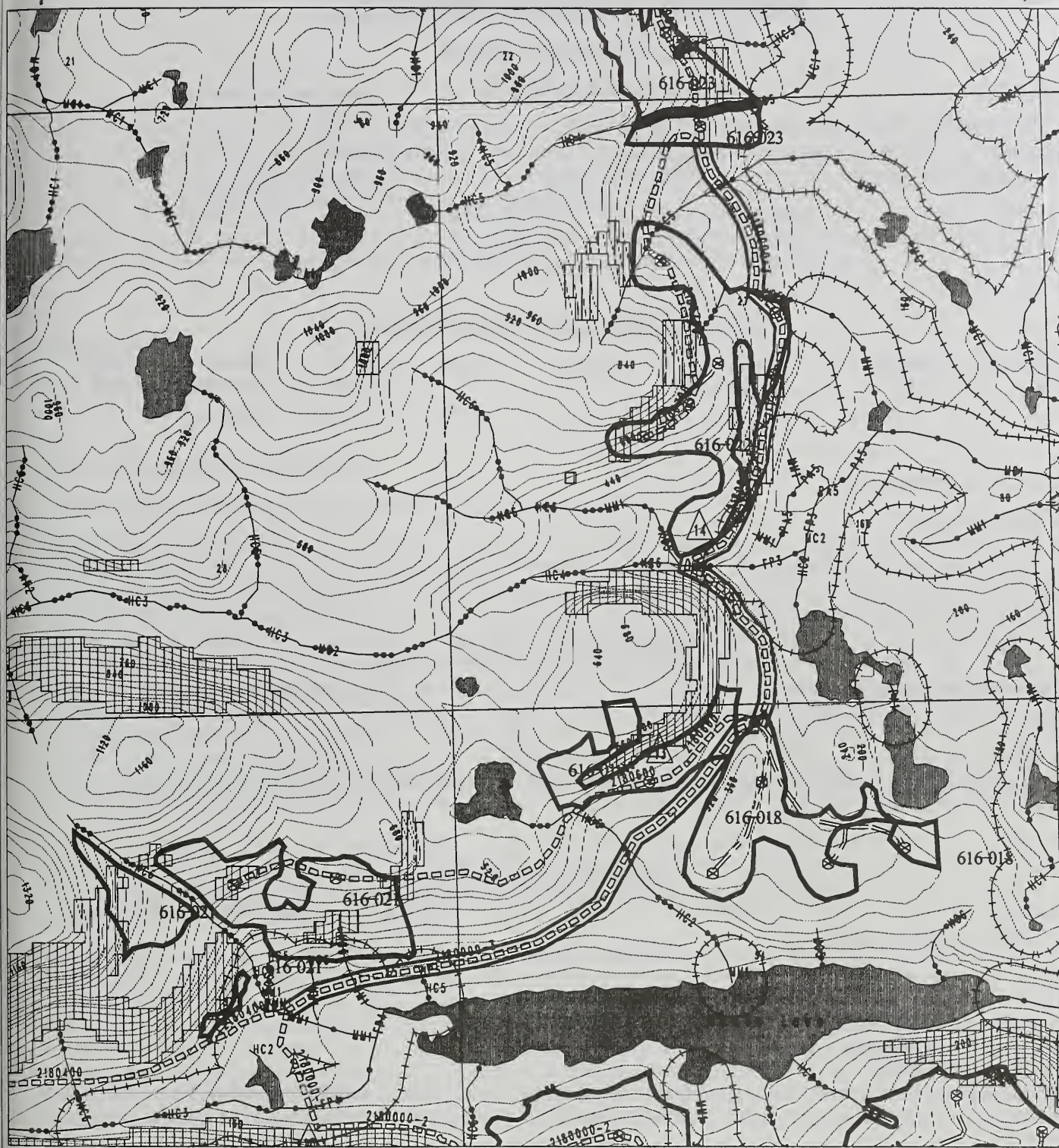
Narrative: Small tributary draining into the lake. Actually class IV rather than III as shown on map.

D.) M.P. 1.32 AHMU Class I Channel Type:FP4 BF Width: 10m BF Depth: 1.1m Substrate: gravel
Gradient : 2% Structure Bridge Passage Req'd.: Yes Timing Dates: 6/15 - 8/7

Narrative: Main inlet to Monie Lake, minimum 80 ft. bridge, good alignment and approach grades. Bridge should fit w/o encroachment on the stream. Bridge engineer to check out foundation for sills. High density coho rearing area on north side of stream. Check final road line for small stream crossings. Timing is for coho, pink, chum, and sockeye. The drainage structures past this point would be removed following completion of activities.



Cholmondeley DEIS Road No. 2180000-3



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes $\geq 72\%$ | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180000-3	Route Name Clover	Status New Construction
Begin M.P. 3.19	Length(miles) 2.07	Begin Termini 3.19
		End Termini 5.26

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: remove all drainage structures and close road upon completion of silvicultural activities.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete beyond unit 616-021.

District Ranger Approval (signature)_____ **Date:**_____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180000-3

Road Location: Road accesses unit 616-018, 616-022, 616-023, road construction should be moderate to easy over most portions of the road. Road located to accommodate logging systems and still have least impact on the other resources. M.P. 1.25 to 1.35 has some sections of steep slopes over 67% where road location goes from bench to bench, small areas of full bench road may be needed thru this section in order to meet BMP's

Wetlands: Road location was completed to avoid wetlands (see map) although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: The proposed route crosses about 0.1 miles of scrub-shrub evergreen wetlands and about 0.3 miles of forested wetlands on relatively steep slopes. About 0.1 miles is located on slopes over 67 percent gradient and another 0.1 miles is located on slopes over 50 percent gradient. Full bench and end-haul construction (BMP 14.7) and timing (BMP 14.6) may be necessary through steep slope sections. A soil scientist should be involved in the plan-in-hand review to apply specific slope stability mitigation (BMP 14.7). Use BMPs 14.12 and 14.19 to control placement of excavated materials. End-haul materials may need to be deposited in wetlands to avoid steep slopes and visual impact. The scrub-shrub wetlands are located on benches and topographic divides and serve to donate water to downslope resources. The forested wetlands are on sideslopes and serve to transfer water to downslope resources. Avoidance of wetlands is impossible given the grade requirements and steep sideslopes. (BMP 14.2 and 33 CFR BMP 1). It may be necessary to locate a rock pit in wetlands as upland sites are on steep slopes and highly visible to Clarence Strait. (33 CFR BMP 8). Helicopter yarding is considered under alternative 2 of this EIS. The 2180-3 road is to be closed following harvest (BMP 14.22). The 2180-3 meets the requirements for the silvicultural exemption from the 404 permitting process. Apply 33 CFR BMPs 2, 4, 5, 6, 8, 11, and 14.

Silviculture: Road No. 2180000-3 provides short access to units 616-021, 616-018, 616-022, and 616-023. Unit 616-021 has potential of 60 acres PCT in 20-25 years. Unit 616-018 has potential for 5 acres planting and 34 acres PCT in 25+ years. Unit 616-022 has potential for 10 acres of planting and survival surveys and 62 acres of PCT in 25+ years. Unit 616-023 has potential for 20 acres of PCT in 25+ years

Wildlife/Botany: As the road goes around the west end of Monie Lake it goes through an area which has a history of known heavy deer/bear/wolf use. Red-tail hawks and an osprey have been reported in the area as well. Upslope from the planned road location Pacific Yew (*Taxus brevifolia*) trees were located. They are between the road location and unit 616-021. The Pacific Yew trees are protected under the Pacific Yew Tree Act of 1992. This act states; A) Inventory and maintain existing populations of Pacific Yew trees, 1) Locate and document the location of any existing plants during Forest Service project activities, B) If found, implement site-specific silvicultural prescriptions to maintain Pacific Yew regeneration capabilities and presence on the site, and C) Retain Pacific Yew during timber stand improvement activities, such as precommercial thinning, where ever feasible (Pacific Yew Act, January 3, 1992, 16 USC 4804; TLMP Chapter 4-page 95).

Lands/Minerals/Geology/Karst:

Visual/Recreation:

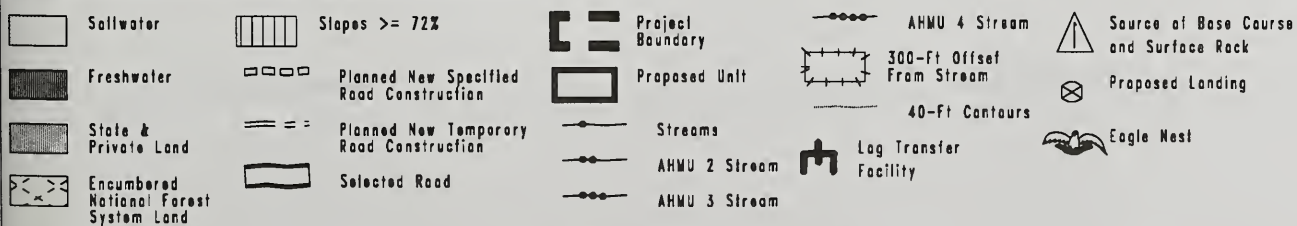
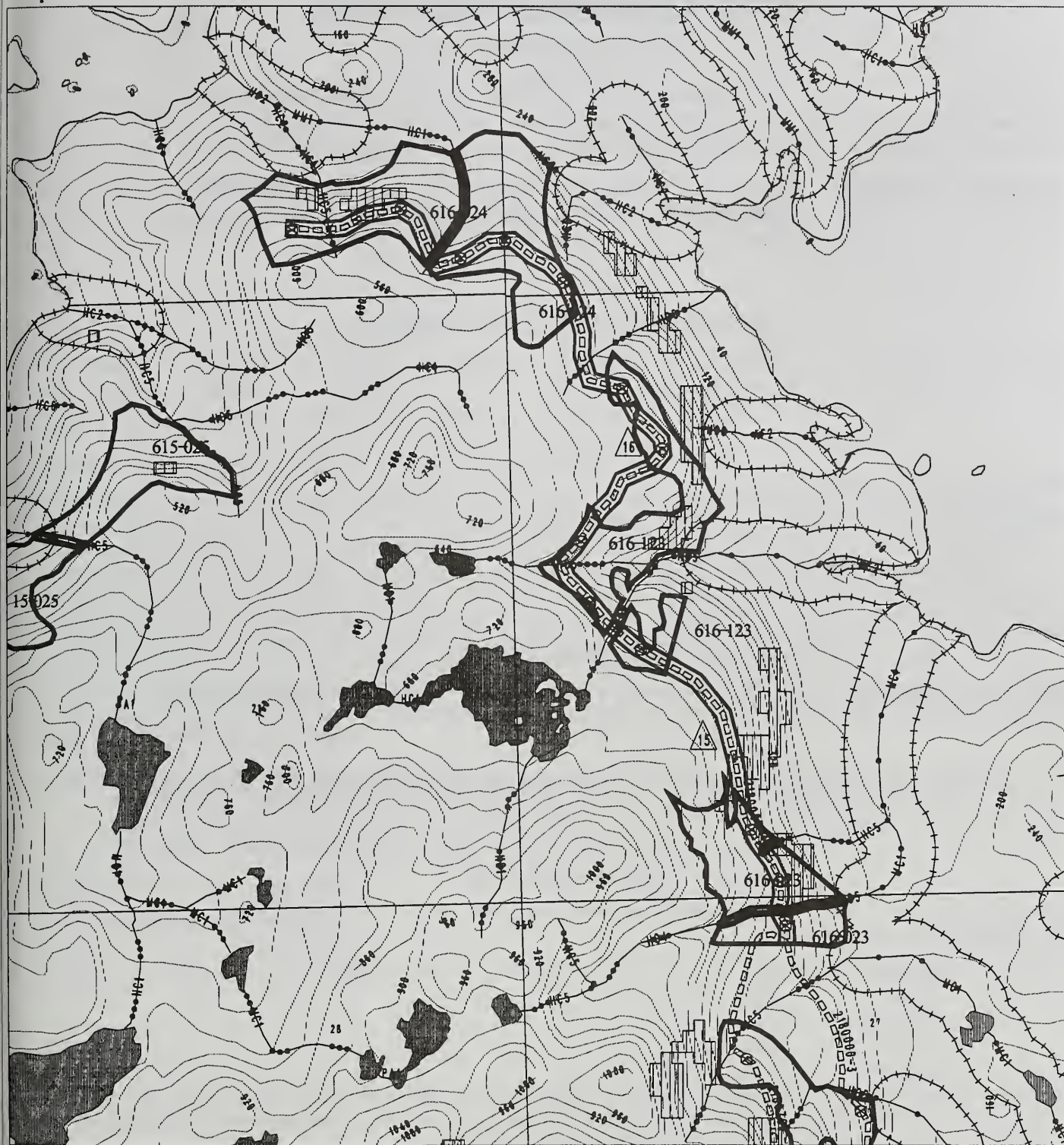
Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180000-3

- A.) M.P. 0.10** AHMU Class I Channel Type:MM1 BF Width: 3m BF Depth: 30cm Substrate: cobble
Gradient 5 % Structure: 2400mm cmp Passage Req'd.: Yes Timing Dates: 6/15 - 8/7
Narrative: Crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 ft. Timing is for coho, sockeye, pink, and chum.
- B.) M.P. 0.18** AHMU Class I Channel Type:MM1 BF Width: .5m BF Depth: 15cm Substrate: cobble
Gradient: 5 % Structure 900mm cmp Passage Req'd.: Yes Timing Dates: 6/15 - 8/7
Narrative: Crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 ft
- C.) M.P. 0.26** AHMU Class I Channel Type:MM1 BF Width: 3m BF Depth: 30cm Substrate: cobble
Gradient 6 % Structure: 900mm cmp Passage Req'd.: Yes Timing Dates: 6/15 - 8/7
Narrative: Crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 ft.
- D.) M.P. 0.75** AHMU Class III Channel Type:HC2 BF Width: 2m BF Depth: 30cm Substrate: bdrk
Gradient: 10 % Structure 1200mm cmp Passage Req'd.: NO Timing Dates: none
Narrative:
- E.) M.P. 1.20** AHMU Class III Channel Type:HC6 BF Width: 9m BF Depth: 100 Substrate: lrg. cobble
Gradient: 17 % Structure Bridge Passage Req'd.: Yes Timing Dates: 6/15 - 9/1
Narrative: Crossing 100 feet above the change to class I. Recommend 3000 mm cmp buried .6m at outlet and laid in flat; or a bridge. Timing is for coho.
- F.) M.P. 1.65** AHMU Class IV Channel Type: HC5 BF Width: 1.5m BF Depth: 20cm Substrate: bdrk
Gradient 25 % Structure: 1200mm cmp Passage Req'd.: No Timing Dates: none
Narrative: Solid rock on both sides of notch at the crossing.
- G.) M.P. 1.95** AHMU Class IV Channel Type:HC5 BF Width: 1m BF Depth: 15cm Substrate: bdrk
Gradient: 35 % Structure: 900mm cmp Passage Req'd.: NO Timing Dates: none
Narrative:



1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180000-4	Route Name Clover	Status New Construction
Begin M.P. 5.26	Length(miles) 1.93	Begin Termini 5.26
		End Termini 7.19

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: remove all drainage structures and close road upon completion of silvicultural activities.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete beyond unit 616-023.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180000-4

Road Location: Road accesses unit 616-024, , 123, 616-023, road construction should be moderate to easy over most portions of the road. Road located to accommodate logging systems and still have least impact on the other resources.

Wetlands: Road location was completed to avoid wetlands(see map) although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources.

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: The proposed 2180-4 contours on 20 to 50 percent sideslopes with no sections on slopes over 67 percent gradient. The road crosses forested wetlands and upland complexes and about 0.1 miles of scrub-shrub evergreen wetlands. All wetlands crossed are located on the shoulder slope near topographic summits. The wetlands serve to donate water to downslope resources. Due to grade requirements the wetlands are unavoidable. Helicopter yarding is considered in alternative 2 and 3 of this EIS (BMPs 12.5 and 33 CFR BMP 1). It may be necessary to locate a rock pit in wetlands as upland sites are on steep slopes and highly visible to Clarence Strait. (33 CFR BMP 8). Slope stability appears to be good along most sections with steeper slopes located near the stream crossing in unit 616-024 (BMP 14.7). A soil scientist should be involved in a plan-in-hand review of this road to determine the specific mitigation (BMP 14.7). Use BMPs 12.5, 14.12, and 14.19 to control excavation of sidecast material in steep areas and wetlands. The 2180-4 is planned for closure following harvest (BMP 14.22) and meets the requirements for the silvicultural road exemption from the 404 permitting process. Apply 33 CFR BMPs 2, 4, 5, 8, and 14.

Silviculture: Road number 2180000-4 provides short access to units 616-023, 616-123, 616-024 and access larger than .5 of a mile for unit 616-025. Unit 616-023 has potential for 20 acres PCT in 25 years. Unit 616-123 has potential for 12 acres release and 35 acres PCT in 20-25 years. Unit 616-024 has potential for 25 acres of PCT in 25+ years. There are no planned post sale activities in unit 615-025.

Wildlife/Botany: No real concerns.

Lands/Minerals/Geology/Karst:

Visual/Recreation: Avoid sidecasting of overburden and excavated rock on downhill slope particularly where road passes through unit.

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180000-4

A.) M.P. 0.08 AHMU Class III Channel Type: HC5 BF Width: 1.5m BF Depth: 20cm Substrate: bdrk
Gradient 25 % Structure: 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative:

B.) M.P. 0.70 AHMU Class III Channel Type: HC5 BF Width: 3m BF Depth: 30cm Substrate: bdrk
Gradient : 35 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative: t

C.) M.P. 0.80 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient 25 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

Narrative:

D.) M.P. 1.25 AHMU Class III Channel Type: HC6 BF Width: .5m BF Depth: 60mm Substrate: bdrk
Gradient : 15 % Structure 450mm cmp Passage Req'd.: NO Timing Dates: none

Narrative: may actually be class IV

E.) M.P. 1.60 AHMU Class IV Channel Type: HC5 BF Width: 1.5m BF Depth: 25cm Substrate: bdrk
Gradient : 18 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none

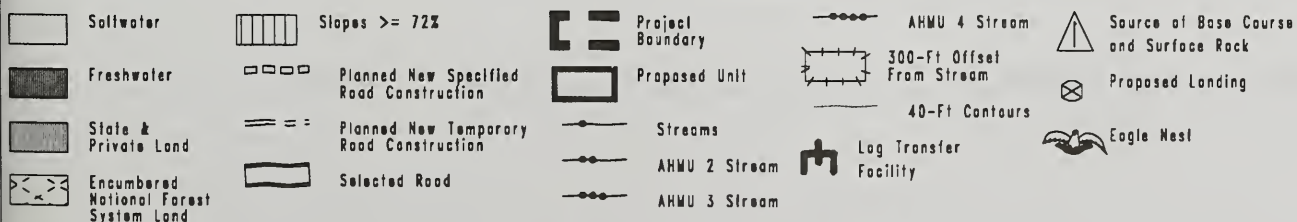
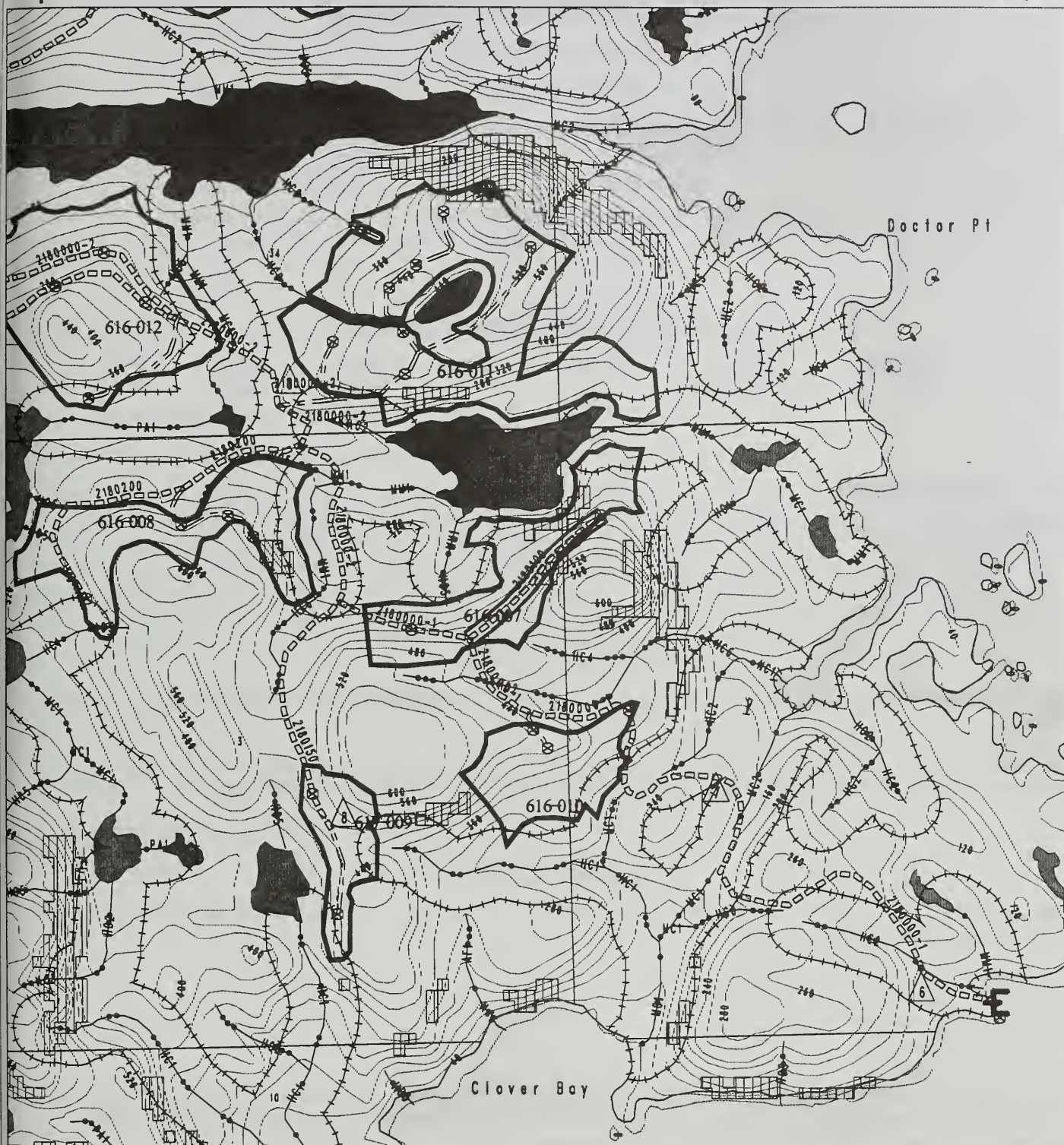
Narrative:

F.) M.P. 1.90 AHMU Class I V Channel Type: HC5 BF Width: 0.5m BF Depth: 10cm Substrate: bdrk
Gradient 35 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

Narrative:



Cholmondeley DEIS Road No. 2180100



1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180100	Route Name Dutchwhite	Status New Construction
Begin M.P. 0.00	Length(miles) 0.30	Begin Termini 0.00
		End Termini 0.30

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LL	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180100

Road Location: Road access unit 617-009, road construction should be moderate to easy over most portions of the road .

Wetlands: Road location was completed to avoid wetlands.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a high probability of salvage timber.

Soils/Water: The proposed route accesses unit 616-007 and is located on a complex of upland and forested wetland soils. The forested wetlands are inside the harvest unit and unavoidable due to grade constraints. Helicopter yarding is considered under alternative 2 in this EIS (BMP 12.5 and 33 CFR BMP 1). The wetlands and uplands occur on moderately steep sideslopes of 30 to 70 percent gradient, and serve to transfer water to downslope resources. There are short segments of slopes over 50 percent gradient on this road. Use BMP 14.7 and determine if full bench construction is necessary. Use BMPs 14.12 and 14.19 to control sidecast material. The 2180100 road is planned for closure following harvest (BMP 14.22) The 2180100 meets the requirements for the silvicultural exemption from the 404 permitting process. Apply 33 CFR BMPs 4, 5, 8, and 14.

Silviculture: Road no. 2180100 provides short access to unit 616-007. Unit 616-007 has potential for 5 acres of planting and 33 acres of PCT in 25+ years.

Wildlife/Botany: No real concerns. The one population of *Platanthera chorisiana* which was found is located within the lake buffer.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180100

No streams crossed on this location



Cholmondeley DEIS Road No. 2180150



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes $\geq 72\%$ | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Lag Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180150	Route Name Dutch	Status New Construction
Begin M.P. 0.00	Length(miles) 0.43	Begin Termini 0.00
		End Termini 0.43

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180150

Road Location: Road access unit 617-009, road construction should be moderate to easy over most portions of the road .

Wetlands: Road location was completed to avoid wetlands,(see map) although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a high probability of salvage timber.

Soils/Water: The proposed route traverses 20 to 60 percent footslopes and sideslopes to access unit 617-009. Almost the entire route is located on non-forested poor fens and forested wetlands. The wetlands occur on footslopes and sideslopes of small knobs and serve to transfer groundwater downslope. Soils are dominantly shallow to bedrock on the sideslopes and deeper on the footslopes. The area is dominated by wetlands, and avoidance of the wetlands is impossible while accessing the unit. Helicopter yarding is considered under alternative 2 and 3 in this EIS. (BMP 12.5 and 33 CFR BMP 1.) Use BMPs 12.5, 14.12, and 14.19 to control excavation of sidecast material in steep areas and wetlands. The 2180-4 is planned for closure following harvest (BMP 14.22) and meets the requirements for the silvicultural road exemption from the 404 permitting process. Apply 33 CFR BMPs 2, 4, 5, 8, and 14.

Silviculture: Road no. 2180100 provides short access to unit 616-007. Unit 616-007 has potential for 5 acres of planting and 33 acres of PCT in 25+ years.

Wildlife/Botany: No real concerns. The one population of *Platanthera chorisiana* which was found is located within the lake buffer.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180150

No streams crossed on this location



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes >= 72% | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180200	Route Name Thimble	Status New Construction
Begin M.P. 0.00	Length(miles) 0.58	Begin Termini 0.00
		End Termini 0.58

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180200

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. No significant areas of steep slopes or unstable soils were crossed on this location.

Wetlands: Road location was completed to avoid wetlands (see map) although wetlands were unavoidable on some most of the location due to safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed 2180200 road skirts along the edge of a scrub-shrub evergreen wetland and upland ecotone. The bulk of the road is located on uplands, just inside the timber. (BMP 12.5 and 33 CFR BMP 1). Helicopter yarding is considered under alternative 2 in this EIS. Grades are moderate and slopes less than 40 percent gradient. No streams are crossed. Use BMPs 12.5, 14.12, and 14.19 to keep sidecast material and fill out of the scrub-shrub wetland. Apply 33 CFR BMPs 3, 4, 5, 6, 8, and 14. The 200 road is planned for closure following harvest and meets the requirements for the silvicultural road exemption from the 404 permitting process. **Silviculture:** Road no. 2180200 provides short access to unit 616-008. Unit 616-008 has potential for 5 acres of planting and 36 acres of PCT in 25+ years.

Wildlife/Botany: This road passes just to the south of a small fen which flanks the lake at the southeastern end of unit 616-012. This fen is rich in plant diversity. Numerous sensitive, rare and unusual plants occur there. Species found in the area include *Utricularia intermedia*, *Potamogeton gramogeton*, *Ranunculus flammula* var. *filiformis*, *Lycopus uniflorus*, *Carex buxbaumii*, *Malaxus paludosa*, *Platanthera chorisiana*, *Botrychium multifidum* and *Senecio moresbiensis*. This fen will be surrounded by road on the south and east and a harvest unit (616-012) on the north. The creek which flows from the fen supports a large population of the sensitive plant *Platanthera chorisiana*. This stream has been buffered 120 feet for fish concerns and will be crossed with a bridge. The middle-tall sedge margin of the fen contains only the second known population on Prince of Wales Island of the sensitive species *Senecio moresbiensis*, the Queen Charlotte butterweed. This area should be excluded from any potential harvest or road building. These mitigation measures should protect the plant populations. The fen area, although not inside a harvest unit, has been a popular helispot. It is recommended that during future work this location be avoided and alternative helispots used. The fen, associated creeks and small lake should be avoided during timber harvest and road building and not used as a staging area.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

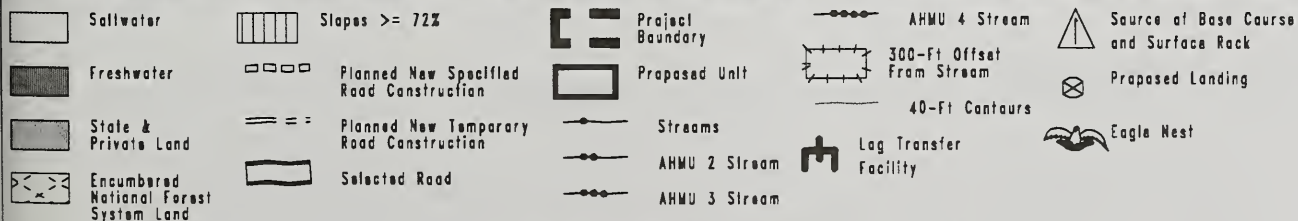
Stream Crossings

Road No. 2180200

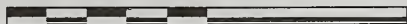
No streams crossed on this location



Cholmondeley DEIS Road No. 2180300



1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180300	Route Name Red	Status New Construction
Begin M.P. 0.00	Length(miles) 1.43	Begin Termini 0.00
		End Termini 1.43

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180300

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. No significant areas of steep ground (>67%) or unstable soils were encountered on this location.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed 2180300 road crosses a small divide and then climbs steadily through unit 616-013 to access a landing in unit 616-016. The route is located mostly on uplands, but crosses a few stringers of forested wetlands adjacent to small streamcourses. There are several short sections on sideslopes of more than 50 percent gradient and a few sections on slopes over 67 percent gradient. Alternative routes would impact more wetlands but on gentler slopes, however an alternative route may be advantageous given the landslide potential and steep gradient of the proposed route. (BMPs 12.5, 14.2, 14.7, and 33 CFR BMP 1). Helicopter yarding is considered under alternative 2 of this EIS. Use BMPs 14.12 and 14.19 to control sidecast material placements. Use full bench construction if necessary to reduce landslide risk. (BMP 14.7). A short sedge fen wetland is present adjacent to the northeast corner of unit 016. The road proposed route skirts the edge of this wetland. The wetland appears to process a large volume of hillslope water, so construction adjacent to the wetland should provide adequate cross drains to maintain circulation into the wetland. Apply 33 CFR BMPs 1, 2, 4, 5, 6, 8, and 14. The 300 road will be closed following harvest (BMP 14.22) and meets the requirements for the silvicultural exemption from the 404 permitting process.

Silviculture: Road no. 2180300 provides short access (> .3 mile) for units 616-012, 616-013, 616-016, and 616-017. Unit 616-012 has potential for 5 acres of planting and 51 acres of PCT in 20-25 years. Unit 616-013 has potential for 5 acres of planting and 65 acres of PCT in 20-25 years. Unit 616-016 has potential for 5 acres planting and 36 acres PCT in 25+ years. Unit 616-017 has potential for 5 acres planting and 12 acres PCT in 25+ years.

Wildlife/Botany: This road has a spur off of it that accesses the southern portion of unit 616-022. This spur road is very close to the northern edge of the biologically significant wetland. In this wetland several species of sensitive, rare or unusual plants were discovered. The species found include *Utricularia intermedia*, *Potamogeton gramineus*, *Ranunculus flammula* var. *filiformis*, *Lycopus uniflorus*, *Carex buxbaumii*, *Malaxus paludosa*, *Platanthera chorisiana*, *Botrychium multifidum* and *Senecio moresbiensis*. The populations are small and the species easily destroyed. This fen is not inside a harvest unit but it has been selected in the past as a favorite helispot. It is recommended that during future activity this location be avoided for repeated helicopter landings. The fen, and associated creeks and small lake, should be avoided during timber harvest and road building and not be used as a staging area. The *Senecio* which was found is only the second known population to exist on Prince of Wales Island. It is located at the northern edge of the wetland closest to the spur road. This area should be protected to the greatest degree possible from all impacts. It is recommended that the spur road be dropped or moved uphill to increase the distance of it from the population of sensitive plants.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings





















Road No. 2180300

A.) M.P. 0.95 AHMU Class III Channel Type:HC5 BF Width: 1m BF Depth: 20cm Substrate: bdrk
Gradient 25 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none
Narrative:

B.) M.P. 1.35 AHMU Class III Channel Type: HC5 BF Width: 1m BF Depth: 20cm Substrate: bdrk
Gradient : 25 % Structure 600mm cmp Passage Req'd.: No Timing Dates: none
Narrative: .

C.) M.P. 1.40 AHMU Class IV Channel Type:HC5 BF Width: 1m BF Depth: 20cm Substrate: bdrk
Gradient 25% Structure 600mm cmp Passage Req'd.: No Timing Dates: none
Narrative:



- | | | | | | | | | | |
|--|--|---|---|---|------------------|---|---------------------------|---|--|
|  | Saltwater |  | Slopes $\geq 72\%$ |  | Project Boundary |  | AHMU 4 Stream |  | Source of Base Course and Surface Rock |
|  | Freshwater |  | Planned New Specified Road Construction |  | Proposed Unit |  | 300-Ft Offset From Stream |  | Proposed Landing |
|  | State & Private Land |  | Planned New Temporary Road Construction |  | Streams |  | 40-Ft Contours |  | Log Transfer Facility |
|  | Encumbered National Forest System Land |  | Selected Road |  | AHMU 2 Stream |  | Eagle Nest | | |
| | | | |  | AHMU 3 Stream | | | | |

1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180310	Route Name Red I	Status New Construction
Begin M.P. 0.00	Length(miles) 0.36	Begin Termini 0.00
		End Termini 0.36

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180310

Road Location: Road located to accommodate logging systems in unit 616-017 and still have least impact on the other resources. No significant areas of steep ground (>67%) or unstable soils were encountered on this location.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on some portions of the location due to safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed 310 road location traverses slopes less than 30 percent gradient and crosses forested wetlands and scrub-shrub evergreen wetlands. The wetlands lie on topographic summits and sideslopes and serve to donate water to downslope resources. The road construction should be mostly rock overlay with minor cuts and fills. Unit 017 lies on forested wetlands and access via uplands is not possible. Helicopter yarding is considered under alternative 2 in this EIS. Landslide potential is low (BMP 14.7). Apply 33 CFR BMPs 2, 4, 5, 8, and 14. The 310 road will be closed to vehicular traffic following harvest and meets the requirements for the silvicultural road exemption from the 404 permitting process.

Silviculture: Road no. 2180310 provides short access to unit 616-017. Unit 616-017 has potential for 5 acres of planting and 12 acres of PCT in 25+ years.

Wildlife/Botany: A population of *Platanthera chorisiana*, a species on the Forest Service sensitive species list was found below the end of the road. The plants are outside of the unit boundary and within a lake buffer. These mitigations should be enough to provide protection to the plants.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

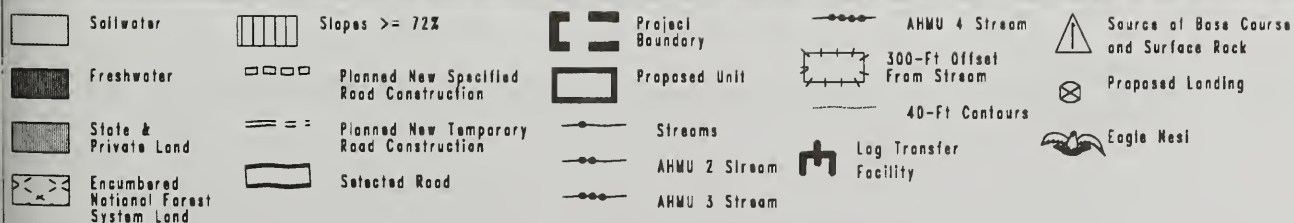
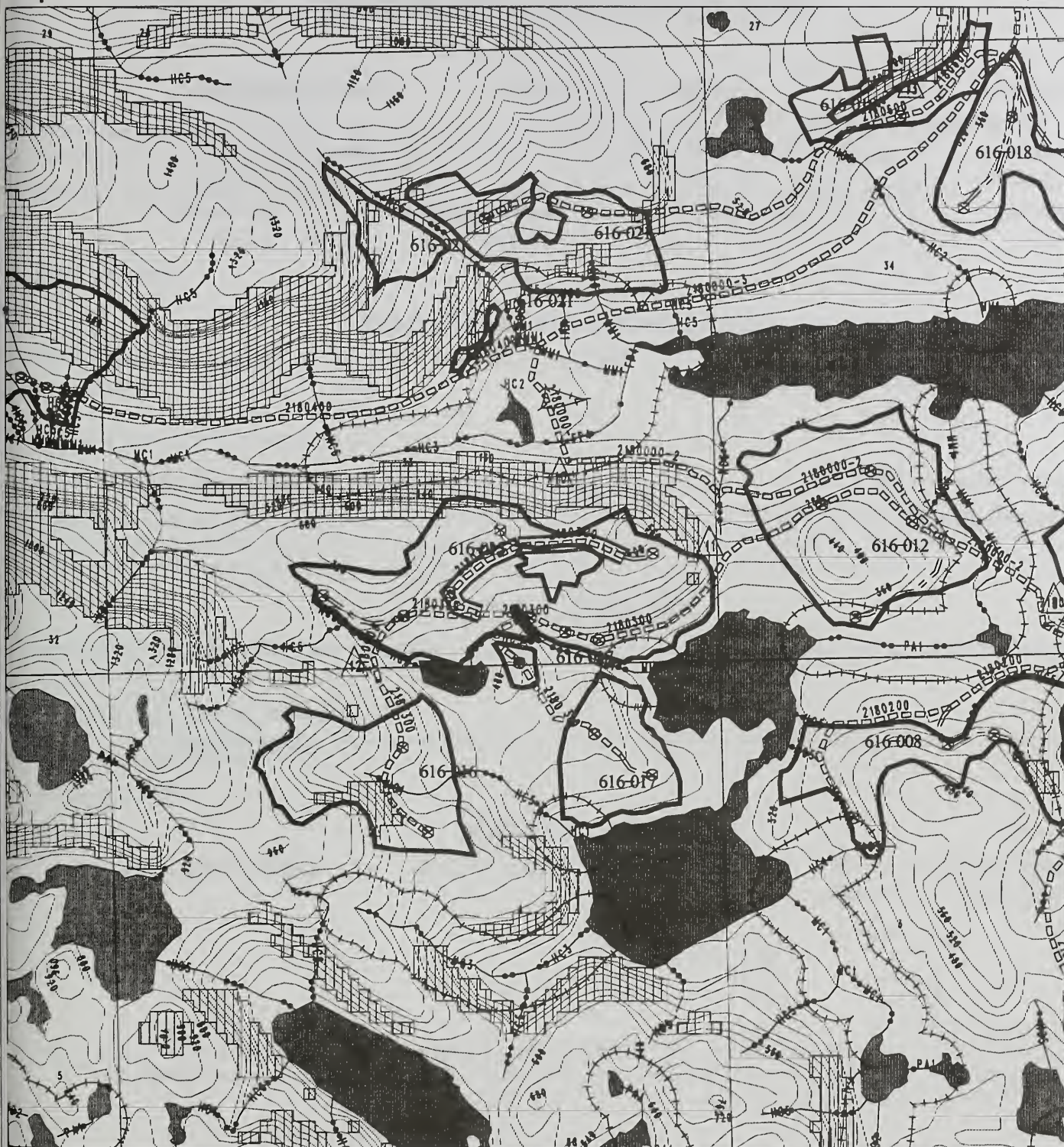
Stream Crossings

Road No. 2180310

A.) M.P. 0.10 AHMU Class III Channel Type:HC2 BF Width: 1.5m BF Depth: 25cm Substrate: bdrk

Gradient 9% Structure 1200mm cmp Passage Req'd.: Yes Timing Dates: none

Narrative: crossing on relatively flat area, overlay construction. Oversize cmp to accommodate burying 1-2 ft. Ensure road is outside of buffer on pond (PA2 wetland).



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180320	Route Name Red II	Status New Construction
Begin M.P. 0.00	Length(miles) 0.38	Begin Termini 0.00
		End Termini 0.38

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature)_____ **Date:**_____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180320

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. No significant areas of steep ground (>67%) or unstable soils were encountered on this location.

Wetlands: Road location was completed to avoid wetlands, there are no mapped wetlands on this location.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed route is located entirely on uplands with sideslopes of 30 to 50 percent gradient. (BMPs 12.5 and 14.2). Landslide potential is high for the first 0.1 miles. Use BMPs 14.7, 14.12, and 14.19 to control sidecast and fill placement to avoid causing a landslide. The 320 road is proposed for closure following harvest (BMP 14.22).

Silviculture: Road no. 2180320 provides short access to unit 616-013. Unit 616-013 has potential of 5 acres of planting and 65 acres of PCT in 20-25 years.

Wildlife/Botany: No real concerns.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

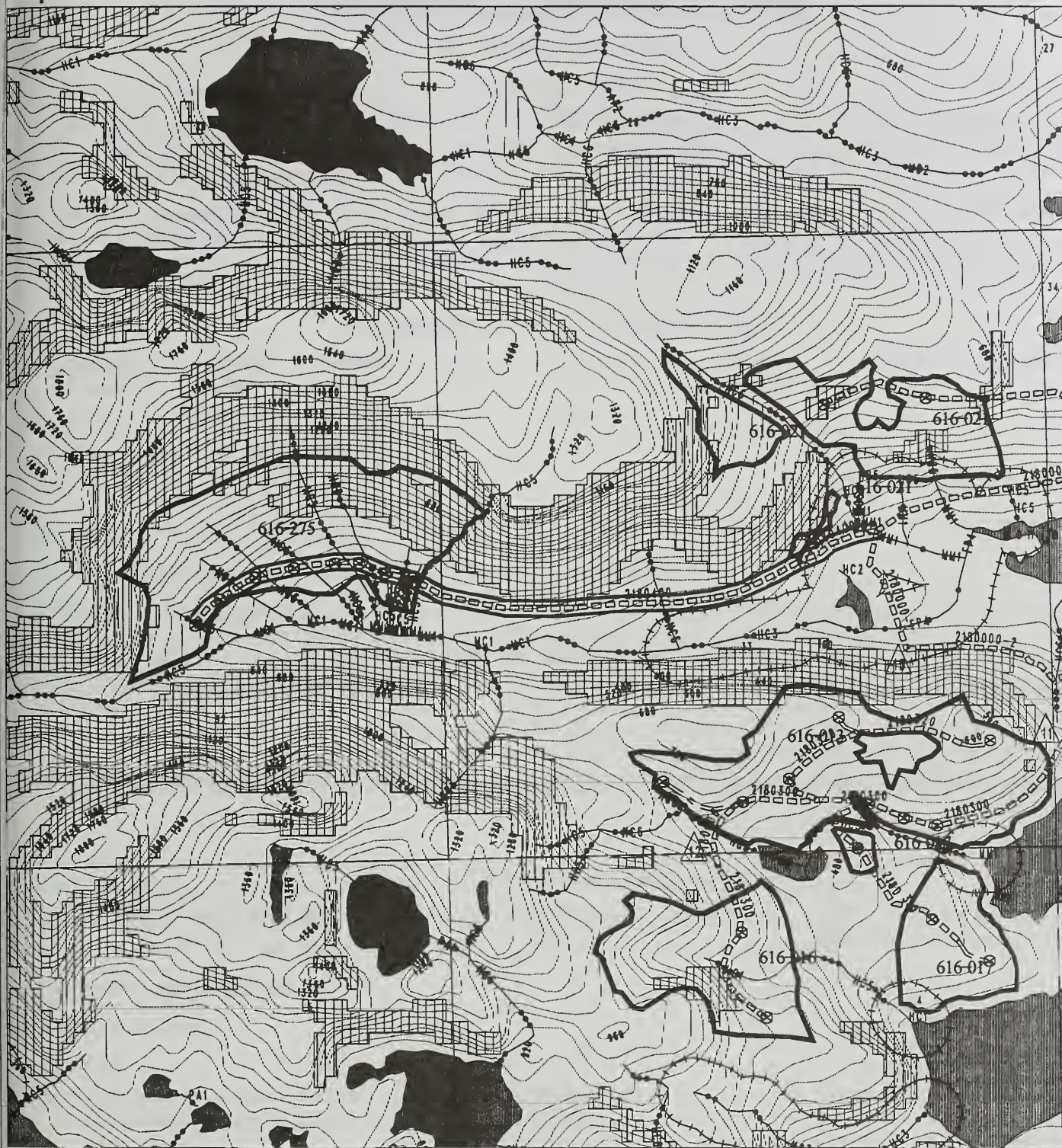
Stream Crossings

Road No. 2180320

No streams crossings encountered on this road location

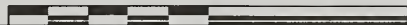


Cholmondeley DEIS Road No. 2180400



- | | | | | |
|--|---|------------------|---------------------------|--|
| Siltwater | Slopes $\geq 72\%$ | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Specified Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180400	Route Name Alsike	Status New Construction
Begin M.P. 0.00	Length(miles) 1.19	Begin Termini 0.00
		End Termini 1.19

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: remove all drainage structures and close road upon completion of silvicultural activities.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180400

Road Location: Road accesses unit 616-275, road construction should be moderate to easy over most portions of the road. Road located to accommodate logging systems and still have least impact on the other resources. Location stays below of any steep(>67%) ground, no unstable soils encountered.

Wetlands: Road location was completed to avoid wetlands (see map) although small portions of wetlands were unavoidable on a part of the location due to practicality, safety, engineering design constraints and considerations for other resources. Only wetlands are near the end of the road, these may be able to be avoided depending on final location of the last logging system landing. Work with logging engineer to try to avoid landings in the wetlands.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: The proposed route follows the footslope and edge of the floodplain on sideslopes less than 40 percent gradient. Landsliding is not a concern (BMPs 14.7). Most of the route is located on an upland and forested wetland complex. (BMP 12.5). The route skirts the edge of a tall sedge fen wetlands near the junction with the 2180 road. This wetland transfers and stores hillslope and creek water for release downstream. The footslope soils serve to transfer water to downslope resources. Use BMPs 14.12, 14.19, 12.5, and 14.18 to keep excavated material out of wetlands. Use BMPs 14.9, 14.11 and 14.17 to maintain hillslope drainage patterns. The 400 road is to be closed to vehicular traffic following harvest (BMP 14.22). Helicopter yarding is considered under alternative 2 in this EIS. The 400 road meet the requirements for the silvicultural exemption from the 404 permitting process. Apply 33 CFR BMPs 1, 2, 3, 4, 5, 6 7, 8 and 14.

Silviculture: Road no. 2180400 provides access to unit 616-275 and to a portion of unit 616-021. Unit 616-275 has potential for 77 acres PCT in 20-25 years. Unit 616-021 has potential for up to 58 ac. PCT in 20-25 years.

Wildlife/Botany: This road begins in an area of known high deer/bear/wolf use. Red-tail hawks and osprey have been seen in the area as well. The road location appears to have been relocated to avoid direct impacts to this area.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180400

A.) M.P. 0.40 AHMU Class III Channel Type: HC6 BF Width: 0.5m BF Depth: 10cm Substrate: cobbles
Gradient 10 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: 6/15 - 8/15

Narrative: Timing may not be necessary depending on proximity of final road location to the main stream below.

B.) M.P. 0.75 AHMU Class IV Channel Type: HC5 BF Width: 1.5 m BF Depth: 20cm Substrate: bdrk
Gradient : 25 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative:

C.) M.P. 0.80 AHMU Class IV Channel Type: HC5 BF Width: 1 m BF Depth: 15 cm Substrate: bdrk
Gradient 25 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

Narrative:

D.) M.P. 0.90 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 10cm Substrate: bdrk
Gradient : 20 % Structure 600mm cmp Passage Req'd.: NO Timing Dates: none

Narrative:

E.) M.P. 0.95 AHMU Class IV Channel Type: HC5 BF Width: 2m BF Depth: 20cm Substrate: bdrk
Gradient : 15 % Structure 900mm cmp Passage Req'd.: No Timing Dates: none

Narrative:

F.) M.P. 1.02 AHMU Class I V Channel Type: HC5 BF Width: 1.5m BF Depth: 15cm Substrate: bdrk
Gradient 15 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

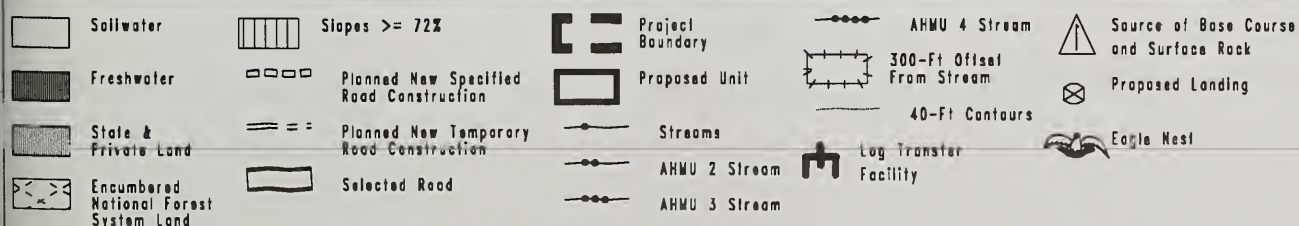
Narrative:

G.) M.P. 1.05 AHMU Class IV Channel Type: HC5 BF Width: 1.5m BF Depth: 20cm Substrate: bdrk
Gradient : 15 % Structure: 600mm cmp Passage Req'd.: NO Timing Dates: none

Narrative:

H.) M.P. 1.08 AHMU Class IV Channel Type: HC5 BF Width: 1 m BF Depth: 15cm Substrate: bdrk
Gradient : 15 % Structure: 600mm cmp Passage Req'd.: NO Timing Dates: none

Narrative:



1320

0.0

1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180600	Route Name Springbank	Status New Construction
Begin M.P. 0.00	Length(miles) 0.99	Begin Termini 0.00
		End Termini 0.99

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: remove all drainage structures and close road upon completion of silvicultural activities.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: This road system is not connected to any public or community road systems or to any ferry system terminal. Road will have all drainage structures removed after harvest and silvicultural activities are complete beyond unit 616-021.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180600

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. Location stays below of any steep (>67%) ground, no unstable soils encountered. One section of steep ground at M.P. 0.60 may require +/- 500 feet of full bench construction. Alternate route location may be feasible and shorten road length by starting road further to the SW on the mainline rd. 2180000.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on some portions of the location due to practicality, safety, engineering design constraints and considerations for other resources. Only wetlands are near the beginning of the road, these may be able to be avoided depending on final location of the junction with 2180000. Work with logging engineer to try to avoid landings in the wetlands.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed route traverses mostly forested upland on slopes of 30 to 70 percent gradient. The first 0.2 miles crosses forested wetlands and scrub-shrub evergreen wetlands that lie on a topographic summit and bench. Due to grade requirements the wetlands are unavoidable. Helicopter yarding is considered under alternative 2 and 3 in this EIS. Landslide potential is relatively high for the last 0.4 miles of the location. Sideslopes range from 40 to 70 percent and full bench and end-haul construction may be necessary for about 500 feet on slopes over 60 percent gradient. (BMP 14.7, 14.12, and 14.19) Disposal of end-haul materials will likely have to occur in wetlands as stable upland sites are limited. A Soil Scientist should be involved in the plan-in-hand review of this road to apply specific landslide mitigation (BMP 14.7). The 600 road will be closed to vehicular traffic following harvest (BMP 14.22). The 600 road meets the requirements for the silvicultural road exemption from the 404 permitting process. Apply 33 CFR BMPs 4, 5, 6, 8, and 14.

Silviculture: Road no. 2180600 provides access to unit 616-021 and 616-019. Unit 616-021 has potential for 58 acres PCT in 20-25 years. Unit 616-019 has potential for 23 acres PCT in 25+ years.

Wildlife/Botany: No real concerns. There have been Pacific Yew trees found in the area below the unit boundary. The Forest Plan Standards and Guidelines, (chapter 4, page95), says that populations of Pacific Yew are to be located and documented and if found to implement silvicultural practices which will maintain Pacific Yew regeneration.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2180600

A.) M.P. 0.30 AHMU Class III Channel Type: HC6 BF Width: 1.5m BF Depth: 30cm Substrate: bdrk
Gradient 35 % Structure: 900mm cmp Passage Req'd.: No Timing Dates: none
Narrative:



Cholmondeley DEIS Road No. 2180700



- | | | | | |
|--|---|------------------|---------------------------|--|
| Saltwater | Slopes $\geq 72\%$ | Project Boundary | AHMU 4 Stream | Source of Base Course and Surface Rock |
| Freshwater | Planned New Spallied Road Construction | Proposed Unit | 300-Ft Offset From Stream | Proposed Landing |
| State & Private Land | Planned New Temporary Road Construction | Streams | 40-Ft Contours | Eagle Nest |
| Encumbered National Forest System Land | Selected Road | AHMU 2 Stream | Log Transfer Facility | |
| | | AHMU 3 Stream | | |

1320 0.0 1320 feet

Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2180700	Route Name Tufted	Status New Construction
Begin M.P. 0.00	Length (miles) 0.62	Begin Termini 0.00
		End Termini 0.62

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	L1	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: remove all drainage structures and close road upon completion of silvicultural activities.

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	N/A
Eliminate	N/A

Travel Management Narrative: Occasional use by all terrain vehicle is expected. This road system is not connected to any public or community road systems or to any ferry system terminal. . Road will have all drainage structures removed after harvest and silvicultural activities are complete beyond unit 616-023.

District Ranger Approval (signature) _____ **Date:** _____

Road Management Objectives

Site Specific Design Criteria

Road No. 2180700

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. Location stays below of any steep (>67%) ground, no unstable soils encountered. One section of steep ground at M.P. 0.60 may require +/- 500 feet of full bench construction.

Wetlands: Road location was completed to avoid wetlands although wetlands were unavoidable on the beginning portions of the location due to practicality, safety, engineering design constraints and considerations for other resources..

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium to high probability of salvage timber.

Soils/Water: The proposed route traverses forested wetland and uplands on sideslopes of 30 to 60 percent gradient. The cedar-hemlock-blueberry-skunk cabbage forested wetland serves to transfer water to downslope resources. Use BMPs 12.5, 14.12, and 14.19 to prevent disposal of excavated materials in wetlands. Helicopter yarding is considered in alternative 2 of this EIS. About 500 feet of the 700 road may require full bench and end-haul construction. Consult with a Soil Scientist during the plan-in-hand review (BMPs 14.7 and 14.12). The 700 road is to be closed to vehicular traffic following timber harvest (BMP 14.22). Apply 33 CFR BMPs 2, 4, 5, 8, and 14. The 700 road meets the requirements for the silvicultural road exemption from the 404 permitting process.

Silviculture: Road no. 2180700 provides access to unit 616-022 and portions of 616-023. Unit 616-022 has potential for 62 acres PCT in 25+ years. Unit 616-023 has potential for up to 20 acres PCT in 25+ years.

Wildlife/Botany: No real concerns.

Lands/Minerals/Geology/Karst:

Visual/Recreation: Avoid sidecasting of overburden and excavated rock on downhill slope particularly where road passes through unit.

Cultural:

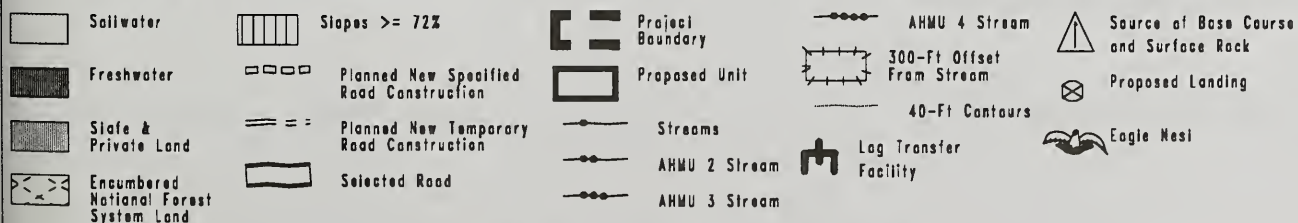
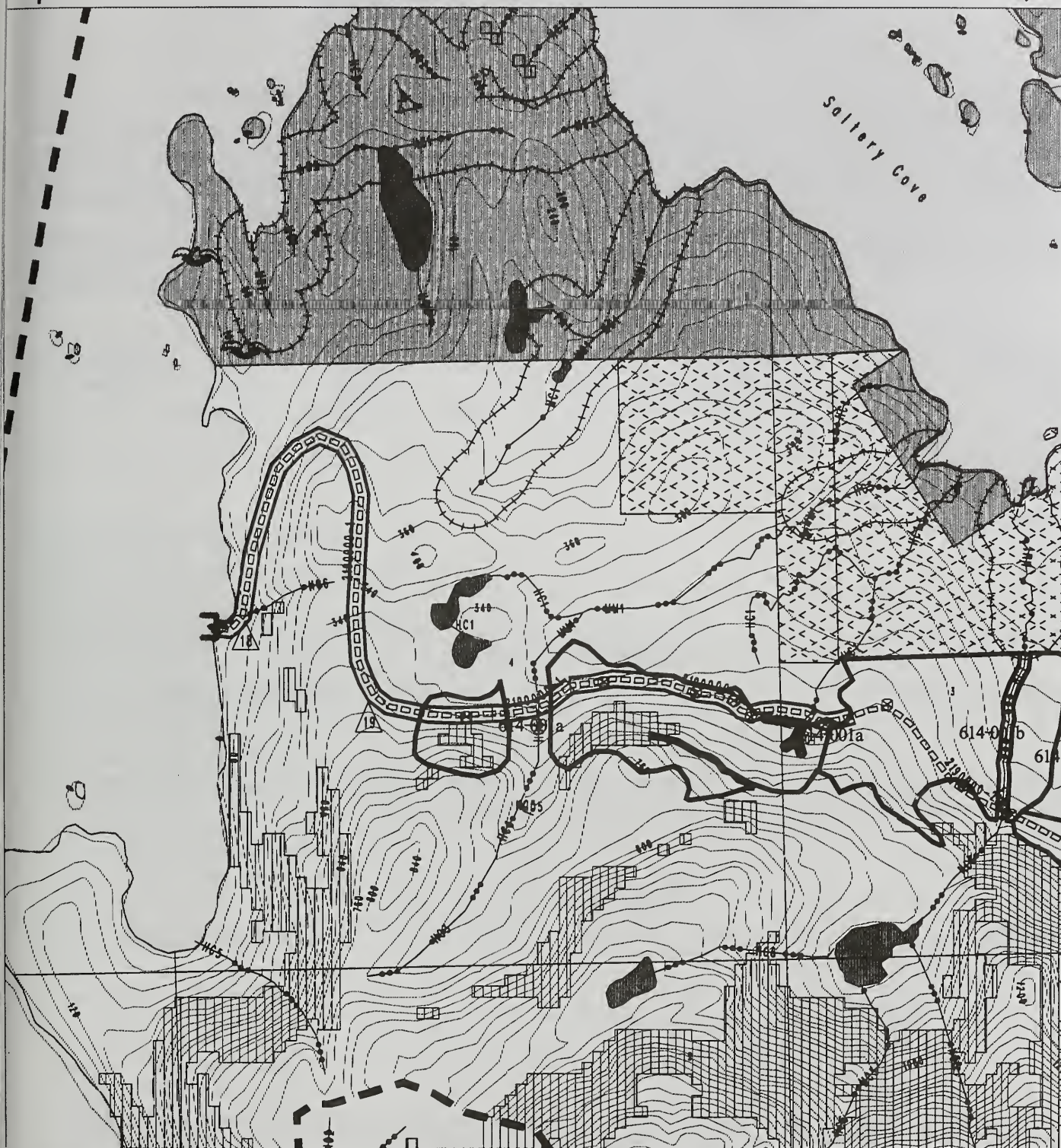
Road Management Objectives

Stream Crossings

Road No. 2180700

A.) M.P. 0.30 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 15cm Substrate: bdrk
Gradient 30 % Structure: 600mm cmp Passage Req'd.: No Timing Dates: none

Narrative:



1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2190000-1	Route Name Saltery	Status New Construction
Begin M.P. 0.00	Length(miles) 1.68	Begin Termini 0.00 LTF
		End Termini 1.68

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: Water bar road every 500 feet and or at critical areas. Remove all drainage structures after completion of silvicultural activities. Seed entire roadway and other disturbed areas.

Operation Criteria

Highway Safety Act:	No	Jurisdiction:	National Forest Ownership
Travel Management Strategies		AFRPR Status:	closed

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	Motorized vehicles
Eliminate	N/A

Travel Management Narrative: Road closed to motorized vehicle traffic with a closure order and put in storage upon completion of harvest and silvicultural activities (3-4 years).. This road system is not connected to any public or community road systems or to any ferry system terminal.

District Ranger Approval (signature)_____ **Date:**_____

Road Management Objectives

Site Specific Design Criteria

Road No. 2190000-1

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. Some steep slopes (>67%) encountered in the first 0.25 miles that may require some full bench endhaul construction. These will be short sections as road traverses from bench to bench. Road provides access to LTF in NE McKenzie inlet. Locate final bridge location at M.P. 1.10 to drain road surface water away from stream.

Wetlands: Nearly entire area is wetlands. Road location was completed to avoid wetlands (see map) although wetlands were unavoidable on most portions of the location due to practicality, safety, engineering design constraints and considerations for other resources.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: Medium to high probability of salvage timber available.

Soils/Water: The proposed route traverses uplands and wetlands on sideslopes of 0 to 60 percent gradient. The first 0.35 miles may require some full bench and end-haul construction (BMP 14.7, 14.12, and 14.19). The wetlands occur on slopes less than 30 percent gradient and include cedar-hemlock-blueberry-skunk cabbage forested wetlands and scrub-shrub evergreen wetlands. The wetlands sit on a broad topographic flat adjacent to ponds that are the headwaters to a domestic water source at Saltery Cove. The wetlands will provide a filter for some of the sediment generated by a portion of the road. Given the LTF location and adjacent steep slopes the wetlands are unavoidable. (BMP 12.5 and 33 CFR BMP 1 and 11). Helicopter yarding is considered in alternatives 2 and 3. Apply BMPs 14.12, 12.5, and 14.19 to keep excavated materials out of wetlands and maintain a minimum footprint in the wetland (33 CFR BMP 6). Use 33 CFR BMP 8 to prevent locating a rock pit in wetlands. Apply 33 CFR BMPs 2, 4, 5, 6, 8, 11, and 14. The 2190-1 proposes to cross a perennial water quality stream that also is used as a domestic water supply. Use BMPs 14.5, 14.6, 14.8, 14.9, 14.10, 14.11, 14.12, 14.14, 14.17, and 14.19 to keep all excavated materials well away from the riparian area and to take immediate steps to control erosion at the crossing. Rock rip-rap, erosion control matting, silt fences and grass seeding may be necessary. A log stringer bridge will be considered to eliminate in-stream work. Construct the crossing during low flow (BMP 14.6). A settling pond may be necessary downstream. Consult a hydrologist or soil scientist during construction to determine the appropriate mitigation and document it in an erosion control plan. The road crossing was moved upslope on stream #4 to avoid stream 5 and allow for yarding without an additional spur above streams 6 and 7. Use BMP 14.2 to maintain the road in such a way as to reduce road surface erosion. Keep equipment fuel storage areas and refueling operations and maintenance out of watershed CU5A. The 2190-1 road is to be closed to vehicular traffic following timber harvest (BMP 14.22). The 2190 road meets the requirements for the silvicultural road exemption from the 404 permitting process. Residents of Saltery Cove will monitor water quality in domestic water supply streams and notify the Forest Service if water quality deteriorates. The Forest Service will take action to insure any unacceptable conditions are fixed.

Silviculture: Road no. 2190000-1 provides short access to unit 614-001. Unit 614-001 has potential for 115 ac PCT in 15-20 years.

Road Management Objectives

Wildlife/Botany: At the eastern most end of this road a population of *Platanthera chorisiana* was documented. This population will be negatively effected if this road is built as planned. It is located where the unit boundary turns abruptly northward. This population should receive adequate protection if the low-productivity mixed conifer forest along the boundary is left undisturbed. In the beaver ponds north of the west end of unit 614-001a a population of *Scirpus subterminalis* was found. This may be the first recorded sighting of this rare species on Prince of Wales Island. The pond is outside of the unit boundary and well below the planned road location. There are two eagle nests, #48 and #59, which are north of the planned LTF. Three more eagle nests are located on the Sentinel Islands. Four of these five nests are more than 1/2 mile away from the LTF. Nest #59 is within the 1/2 mile radius of the LTF. Timing will be required on the construction of this LTF and possibly the road. Even if this area goes to a helicopter logging system timing may be required on the helicopter flight path.

Lands/Minerals/Geology/Karst:

Visual/Recreation: LTF will face directly out over saltwater with very little opportunities for buffering. After harvest is complete re-contour disturbed areas as much as possible and re-vegetate with native plants. Avoid sidecasting of overburden and excavated rock on downhill side of road that leads from LTF to top of ridge. Minimize clearing limits as much as possible on this section of road.

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2190000-1

The road passes through a domestic water supply watershed. Avoid construction activities within the watershed during very wet periods.

A.) M.P. 0.07 AHMU Class III Channel Type: HC6 BF Width: 1m BF Depth: 15cm Substrate: bdrk
Gradient 18% Structure: 900mm cmp Passage Req'd.: No Timing Dates: none
Narrative:

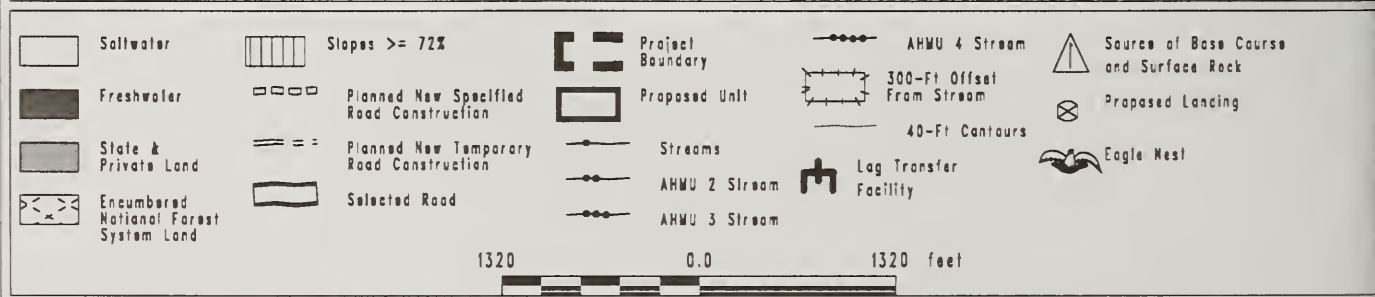
B.) M.P. 1.10 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 30cm Substrate: cobble
Gradient : 15 % Structure bridge Passage Req'd.: No Timing Dates: none
Narrative: The stream is part of a private water system. Use a bridge to cross the stream to protect water quality and limit stream crossing work to low flow periods.

C.) M.P. 1.55 AHMU Class III Channel Type: HC5 BF Width: 1m BF Depth: 15cm Substrate: cobble
Gradient : 15 % Structure: log stringer bridge Passage Req'd.: No Timing Dates: none

Narrative: The stream is part of a private water system. Use a log stringer bridge to protect water quality and limit stream crossing work to low flow periods.



Cholmondeley DEIS Road No. 2190000-2



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2190000-2	Route Name Saltery	Status New Construction
Begin M.P. 1.68	Length(miles) 1.84	Begin Termini 1.68
		End Termini 3.52

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
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Maintenance Narrative: Water bar road every 500 feet and or at critical areas. Remove all drainage structures after completion of silvicultural activities

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
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Travel Management Strategies

Encourage:	N/A
Accept:	Hikers, Bicycles
Discourage:	N/A
Prohibit:	Motorized vehicles
Eliminate	N/A

Travel Management Narrative: Road closed to motorized vehicle traffic with a closure order and put in storage upon completion of harvest ad silvicultural activities (3-4 years).. This road system is not connected to any public or community road systems or to any ferry system terminal.

District Ranger Approval (signature)_____ **Date:**_____

Road Management Objectives

Site Specific Design Criteria

Road No. 2190000-2

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. Some steep slopes (>67%) encountered M.P. 1.4 to M.P.1.6 that may require some full bench end-haul construction. These will be short sections as road traverses from bench to bench.

Wetlands: No areas of wetlands encountered on this location

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium probability of salvage timber.

Soils/Water: The proposed 2190-2 traverses 40 to 70 percent sideslopes on uplands. No wetlands were identified along the proposed road route (BMP 12.5). High landslide potential occurs in the north end of unit 614-034B. Some full-bench and end-haul may be required in this area (BMP 14.7). Use BMPs 14.12 and 14.19 to control placement of sidecast material. The 2190-2 is proposed for closure to vehicular traffic following harvest (BMP 14.22). High-risk structures on the streams in the north end of unit 614-034B should be removed.

Silviculture: Road no. 2190000-2 provides short access to units 614-001, 614-002, and 614-034. Unit 614-001 has potential for 115 acres PCT in 15-20 years. Unit 614-002 has potential for 10 acres planting and 63 acres PCT in 15-20 years. Unit 614-034 has potential for 15 acres planting (5 ac. SS, 10 ac. YC) and 88 acres PCT in 20-25 years.

Wildlife/Botany: A population of the sensitive species *Platanthera chorisiana* was found at the junction of this road and 2190000-1. This population is along the unit boundary where the boundary turns abruptly northward. The plants should receive adequate protection if the low-productivity mixed-conifer forest in the boundary area is left undisturbed. Another larger population of this species was discovered within the boundary of unit 614-001b. The area it is located in is not the typical mixed-conifer forest. The plant species present indicate a higher-nutrient regime requirement. Because of the unique nature of this wetland as well as the presence of the sensitive plant species it is recommended that this area be avoided for road building and timber harvest. Coordinate final road location to avoid sensitive species where possible.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural:

Road Management Objectives

Stream Crossings

Road No. 2190000-2

The beginning of the road passes through a domestic water supply watershed. Avoid road construction during extremely wet periods.

A.) M.P. 0.30 AHMU Class III Channel Type: HC6 BF Width: 2m BF Depth: 30cm Substrate: bdrk
Gradient 22% Structure: log stringer Passage Req'd.: No Timing Dates: 6/15 - 9/1
bridge

Narrative: Timing for coho, pink, and chum downstream. This stream is used as a private water supply for homes in Sallery Cove. Use a log stringer bridge to minimize water quality impacts.

B.) M.P. 1.25 AHMU Class III Channel Type: HC5 BF Width: 2m BF Depth: 20cm Substrate: bdrk
Gradient : 40% Structure 600mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1
Narrative: Stream had a recent debris torrent, about ten years ago. Timing is for coho in Sallery Lake..

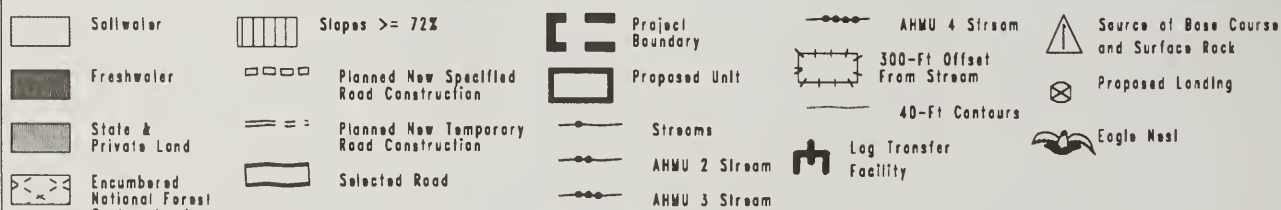
C.) M.P. 1.50 AHMU Class III Channel Type: HC5 BF Width: 3m BF Depth: 30cm Substrate: bdrk
Gradient 28% Structure: 1200mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1
Narrative:

D.) M.P. 1.75 AHMU Class IV Channel Type: HC5 BF Width: 1m BF Depth: 15cm Substrate: bdrk
Gradient : 19% Structure 900mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1
Narrative:

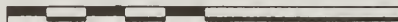
E.) M.P. 1.85 AHMU Class III Channel Type: HC5 BF Width: 3m BF Depth: 25cm Substrate: bdrk
Gradient 28% Structure: 1200mm cmp Passage Req'd.: No Timing Dates: none
Narrative:



Cholmondeley DEIS Road No. 2190100



1320 0.0 1320 feet



Road Management Objectives

Project/EIS Cholmondeley	System Prince of Wales	Land Use Designation TM
Route No. 2190100	Route Name Peppery	Status New Construction
Begin M.P. 0.00	Length(miles) 0.72	Begin Termini 0.00
		End Termini 0.72

General Design Criteria and Elements

Functional Class	Service Life	Traffic Service Level	Surface	Width	Critical Vehicle	Design Vehicle	Design Speed
L	LI	D	rock	14ft.	Log Truck	Log Truck	10

Intended Purpose/Future Use

Silvicultural activities

Maintenance Criteria

Operational Maintenance Level	2	Objective Maintenance Level	1
--------------------------------------	---	------------------------------------	---

Maintenance Narrative: close road after post sale activities by removing all culverts and waterbarring road

Operation Criteria

Highway Safety Act: No	Jurisdiction: National Forest Ownership	AFRPR Status: closed
Travel Management Strategies		

Encourage:	N/A
Accept:	Hikers, Bicycles,
Discourage:	N/A
Prohibit:	Motorized vehicles
Eliminate	N/A

Travel Management Narrative: Road closed to motorized vehicle traffic with a closure order and put in storage upon completion of harvest ad silvicultural activities (3-4 years).. This road system is not connected to any public or community road systems or to any ferry system terminal.

District Ranger Approval (signature)_____ **Date:**_____

Road Management Objectives

Site Specific Design Criteria

Road No. 2190100

Road Location: Road located to accommodate logging systems and still have least impact on the other resources. Location stays below of any steep (>67%) ground, no unstable soils encountered.

Wetlands: No wetlands encountered on this location, no mapped wetlands.

Erosion Control:

Rock Pits: As shown on map, no major concerns.

Resource Information (If applicable):

Timber/Logging: There is a medium probability of salvage timber.

Soils/Water: The proposed route traverses 30 to 50 percent sideslopes on uplands. The route is located on relatively stable terrain with 3 water quality stream crossings. High landslide potential occurs in the north end of unit 614-034B. Some full-bench and end-haul may be required in this area (BMP 14.7). Use BMPs 14.12, and 14.19 to keep excavated material out of streams. Use BMP 14.9 to control runoff. The 2190100 road is to be closed to vehicular traffic following timber harvest (BMP 14.22). Remove all stream crossing structures (BMPs 14.20)

Silviculture: Road no. 2190100 provides access (> .5 mile) to unit 614-034. Unit 614-034 has a potential of 15 acres of planting (5 ac. SS, 10 ac. YC) and 88 acres of PCT in 20-25 years.

Wildlife/Botany: No real concerns.

Lands/Minerals/Geology/Karst:

Visual/Recreation:

Cultural: no concerns. A sample of roads will be selected for post-construction monitoring to evaluate the Heritage probability model.

Road Management Objectives

Stream Crossings

Road No. 2190100

A.) M.P. 0.05 AHMU Class III Channel Type:HC5 BF Width: 2m BF Depth: 20cm Substrate: bdrk
Gradient 40 % Structure: 1200mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1

Narrative: Stream had a recent debris torrent, about ten years ago. Timing is for coho in Saltery Lake.

B.) M.P. 0.25AHMU Class III Channel Type: HC5BF Width: 3m BF Depth: 30cm Substrate: bdrk
Gradient : 28% Structure 1200mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1

Narrative:

C.) M.P. 0.55 AHMU Class III Channel Type:HC5 BF Width: 2m BF Depth: 25cm Substrate: bdrk
Gradient 35 % Structure: 1200 mm cmp Passage Req'd.: No Timing Dates: 6/15 - 9/1

Narrative:

Appendix D

Mitigation Measures

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Appendix D

Project-specific Mitigation Measures

Mitigation measures described below are site-specific mitigation measures tied to specific Forest-wide Standards and Guidelines and/or Best Management Practices listed in the Forest Plan (for example, MG12-II refers to a standard and guideline in the Minerals and Geology section of the Forest Plan). The wordings used in the mitigation measure descriptions in this appendix are paraphrases of Forest Plan standards and guidelines and BMP's. Refer to the Forest Plan for details. The Forest Plan takes precedence over this appendix.

Appendix D includes a table used to indicate the applicable harvest units or roads for each mitigation measure.

I. Site-specific Mitigation Measures Incorporated into Unit and Road Design

The specific mitigation measures that are applied to selected units and/or roads in a project are on unit and road cards (Appendices B and C) and repeated in this section. The source(s) of each general measure are listed after the measure in terms of individual Forest-wide Standards and Guidelines (see Chapter 4 of the Forest Plan) or BMP's (see Appendix C of the Forest Plan and Chapter 10 of FSH 2509.22, The Soil and Water Conservation Handbook). The table following this list indicates to which units and/or roads each measure applies. . (All unit listings are for Alternative 5 unless noted.) The unit and road cards in Appendices B and C include detailed information pertaining to the site-specific application of BMP's and Forest Plan standards.

MINERALS AND GEOLOGY

M1 Protection of Mineral Development Improvements: Protect known mineral development improvements, such as mine claim markers, by specifications in timber sale and road construction contracts. (MG12 - II)

Units: all

M2 Access to Mining Claims: Permit reasonable access to mining claims in accordance with approved plans of operation. (MG12-I)

Units: all

KARST AND CAVE RESOURCES

K1 Avoid Effects on Karst/Cave Features: Avoid road construction or modify harvest unit design to avoid impacts on karst or cave features. (KARST - III-4)

Units: 674-032 and 675-032.

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K2 Suspension Requirements to Protect Karst/Cave Features: Use partial to full suspension for yarding to reduce effects of harvest on karst or cave resources. (KARST - III4 and Appendix I of the Forest Plan FEIS)

Unit: 674-032

K3 Other Specific Protection Measures for Karst/Cave Features: Develop site-specific protective measures for karst and cave features. (KARST - III4)

Unit: 674-032

FISH, WATER, and SOILS

F1 Riparian Buffers: Maintain riparian areas in mostly natural condition through implementation of no-harvest and selective cut buffers along selected streams and around lakes as defined by the Riparian Standards and Guidelines. (RIP2, BMP 12.6)

Units: 614-001a,-001b,-002,-034a,-034b,-005, 615-025, 616-007,-008,-010,-011,-012,-013,-016,-017,-018,-019,-021, -022,-023,-024,-123,-275, 617-009, 674-032,-537,-548,-583, 675-028,-029,-030,-031,-033,-037,-462.

F2 Directional Felling Along Buffers: Trees identified for harvest will be felled to avoid stream courses and riparian areas designated for "no commercial harvest." (RIP2-II)

Units: all

F3 Class III/IV Stream Protection: Split yard and directionally fall trees away from all Class III streams and from Class IV streams where feasible. (RIP2-II)

Units: 614-002,-034a,-034b,-005, 615-025, 616-007,-008,-012,-016,-021,-022,-023,-024,-123,-275, 674-548, -551,-583, 675-030,-033,-037, 676-592.

F4 Yarding Across Streams: Fully suspend logs where yarding is to be done across streams or the full length of a stream or drainage. When this is not feasible for Class IV streams, trees may be partially suspended when yarding across streams. (RIP2-II)

Where applicable.

F5 Fish Passage: Maintain fish passage at Class I and II stream road crossings using properly designed stream crossing structures (consult the Aquatic Habitat Management Handbook, FSH 2609.24). (FISH112-IV)

Roads: 21700001, 21800001, 21800003

F6 Use of Bridges: Install bridges at designated stream crossings to minimize the amount of sediment entering streams and/or to ensure good fish passage. (TRAN 214-II)

Units: 614-001a, -001b, 616-012,-021, 675-028, 675-029,

Roads: 2170000-1, 2180000-1, 219000-2 inside the previous units.

F7 Instream Construction Timing Restrictions: Implement timing restrictions for instream construction activities for the protection of anadromous and resident fish. (RIP2-II and BMP's 14.6, 14.10, 14.14, and 14.17)

Units: 21700000-2, 2170000-3, 2180000-2, 2180000-3, 2190000-2.

F8 Siting of Road-Stream Crossings: Modify the location of road-stream crossings to correspond with stable stream reaches. (TRAN214-II)

Roads: on all roads most stable crossing options will be explored during layout.

F9 Routing of Roads near Streams: Modify road routes to avoid locations near fish-bearing streams. (TRAN214-II)

Roads: 2170-1

F10 Avoid wetlands and other sensitive areas during road location, design and construction. (TRAN214-III, BMPS 12.4, 12.5, and 14.2)

Roads: 2170000-1,-2,-3, 2170450, 2180000-1,-2, -3, -4, 2180100, 2180150, 2180200, 2180300, 2180310, 2180320, 2180400, 2180600, 2180700, 2190000-1, 2190000-2, 2190100.

F11 Avoid wetlands and other sensitive areas during unit location, design, and harvest. (S&W112-I, BMP 12.4, 12.5 and 13.2)

Units: 614-001a, -001b,-002,-034a,-034b,-005, 615-025, 616-007,-008,-010,-011,-012,-013,-016,-017,-018, -019,-021,-022,-023,-024,-123,-275, 617-009, 674-032,-537,-548,-549,-550,-551,-583, 675-028,-029,-030,-032,-033,-037, 676-462,-472,-484,-489,-500.

F12 Use Access and Travel management to reduce Erosion and protect water quality. Control access and manage road use to reduce the risk of erosion and sedimentation from road surfaces disturbance especially during the higher risk periods associated with high runoff and spring thaw conditions. (BMP's 14.8, 14.20, and 14.22)

Roads: 2170000-1,-2,-3, 2170450, 2180000-1,-2, -3, -4, 2180100, 2180150, 2180200, 2180300, 2180310, 2180320, 2180400, 2180600, 2180700, 2190000-1, 2190000-2, 2190100.

F13 Storm-proofing Roads: Design system roads with oversized culverts, outfall riprap, armored dips adjacent to culverts, substantial ditch blocks, drivable waterbars, and/or other measures to prevent culvert failure or erosion during periods of inactivity. (TRAN22-I)

Roads: None. All roads on the Cholmondeley project Area will be put in storage following timber harvest.

F14 Road Storage: Place roads in long-term storage by removing culverts and/or providing safety drainages at each crossing. (TRAN22-I, BMP 14.22)

Roads: All roads on the Cholmondeley Project Area.

F15 Avoid Harvest on slopes over 72% and Very High Hazard Soils: In the following list of units where slopes over 72% are proposed for timber harvest follow guidelines in the Forest plan. (S&W112-I, BMP 13.5)

Units: 614-001a, 614-0034a&b, 614-005, 615-025, 616-007, 616-008, 616-011, 616-013, 616-016, 616-019, 616-021, 616-023, 616-024, 616-275, 674-548, 674-549, 674-550, 674-551, 675-030, 675-033, 675-037, 676-462, 676-484, 676-489.

F16 Avoid Road Development on slopes over 67% gradient: Avoid road construction along unstable slopes, including slopes > 67%. (S&W112-I and BMP13.5)

Roads: 2170-1, 2170-3, 21701450, 2180-2, 2180-4, 2180150, 2180200, 2180310, 2180320, 2180400, 2190100.

F17 Where road construction on slopes over 67% gradient is unavoidable, follow BMP 1.7 and S&W112-1.

Roads: 2170-2, 2180-1, 2180-3, 2180100, 2180300, 2180600, 2180700, 2190-1, 2190-2.

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F18 Follow BMP 13.9 to determine the appropriate yarding techniques to protect soil productivity and prevent soil erosion. (BMP 13.9, S&W112-1).

Units: all

F20 Domestic Water Supply Protection: In watersheds used for domestic water supply use stringent application of BMP's 12.6a, 12.8, 12.9, 13.2, 14.2, 14.5, 14.6, 14.8, 14.10, 14.17, 14.18, 14.19, and 14.20, as outlined on the unit and road cards to minimize impacts to streams used for drinking water. Special measures could include limited rock pit development in domestic watersheds where practicable; sediment traps in newly constructed ditchline and at the outlet of ditch relief culverts and water quality streams, and timing of road construction activities to avoid extremely wet periods.

Units: 614-001a, 616-010, 675-028,-029.

Roads 2170000-1, 2170000-2, 2180000-1, 2190000-1, 2190000-2.

F21 Watershed Analysis: Conduct watershed analysis (per Appendix J of the Forest Plan FEIS) in order to refine prescriptions and more fully address cumulative watershed effects. (S&W112-II, BMP 12.1)

Units: all.

Roads: all.

F26 Water Quality Protection for Mariculture: Drop road plans south of Sunny Creek.

TIMBER

T1 Maintain Advance Regeneration: Maintain advance regeneration within the unit to meet reforestation needs and stand objectives. (TIM111-2-I)

Units: 615-025, 616-011, 674-549,-550,-551, 675-033.

T4 Timing of Helicopter Operations: Helicopter water or barge drops are prohibited in Sallery Cove from 3 p.m. to 7 a.m. between Memorial Day and the end of September. Helicopter drops are prohibited in Clover Bay between June 1 and mid-August.

Units: 614-001a & b,-002,-034a & b,-005, 616-007,-008,-010,-011,-012,-013,-016,-017, 617-009.

T5 Administration during Operations: Forest Service contract representatives will be on site, on a regular basis, during critical road building operations in the drinking water watersheds of Sallery Cove, Sunny Cove, and Clover Bay.

Roads: 2170000-1, 2170000-2, 2180000-1, 2190000-1, 2190000-2

WILDLIFE and THREATENED/ENDANGERED/SENSITIVE SPECIES

W1 Even-aged Clearcutting with Reserves: Provide for greater habitat diversity on a stand level over time by using clearcutting with reserve trees (even-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). Reserves do not meet criteria for two-aged management (WILD112 - III)

Units: 614-001a & b,-002,-034a & b,-005, 616-007,-008,-010,-011,-013,-016,-018,-019,-021,-022,-023,-024,-123,-275, 617-009, 674-537,-548,-583, 675-028,-029,-030,-031,-032,-033,-037, 676-462,-472,-484,-489,-500,-592.

W4 Two-aged Management with Reserves: Provide for greater habitat diversity on a stand level over time by leaving reserve trees (two-aged system) as a harvest prescription; meets two-aged criteria (see Appendix G to Forest Plan FEIS). (WILD112 - III)

units: 616-007,-008,-012,-013,-024. (614-001a & b,-002,-034a & b,-005 Alternative 3 only).

W5 Even-aged Patch or Strip Clearcutting: Provide for greater habitat diversity on a stand level over time by using patch or strip corridors as a harvest prescription. Does not meet two-aged criteria (see Appendix G to Forest Plan FEIS). (WILD112-III)

Units: 614-001a, 616-022,-023.

W6 Uneven-aged Selection Harvest: Provide for greater habitat diversity on a stand level over time by using the selection method (group or individual tree) as a harvest prescription (see Appendix G to Forest Plan FEIS). (WILD112 - III)

Units: 614-002, 616-017, 674-032

W7 Leaving Non-merchantable Trees and Snags: Provide for greater habitat diversity on a stand level over time by leaving most non-merchantable trees and snags after harvest. (WILD112 - III)

Units: all units leave some trees and/or snags.

W8 Restrictions on Helicopter Yarding: Modify helicopter yarding routes and/or timing of helicopter activity to avoid important wildlife habitats (e.g., mountain goat summer/kidding habitat or active eagle nest sites). (WILD112-XII)

Nests close to Sunny Point and McKenzie LTF's.

W9 Road Closures: Close roads to motorized use after silvicultural activities are complete to protect wolves, marten and other large predators and furbearers from over-harvest. (WILD112)

Roads: 2170000-1, 2170000-2, 2180000-1, 2190000-1, 2190000-2

W13 Protection of Bald Eagle Nest Trees/Other Sites and Timing of Activities: Manage bald eagle habitat in accordance with the Interagency Agreement established with the U.S. Fish and Wildlife Service. (WILD112-V)

McKenzie Inlet, Clover Bay, and Sunny Cove.

W20 Protection of Trumpeter Swan Nesting, Brooding, and Wintering Areas and Timing of Activities: Avoid all activity, modify unit or road design, and/or limit timing of activities, within 0.5 mile of wetlands used by nesting, brood-rearing, and wintering trumpeter swans to avoid impacts. (TE&S-II)

Unit: 614-002

W22 Timing of Activities and Disturbance of Herons and Raptors during Nesting: Minimize disturbance of heron rookeries and raptor nests, by restricting development activities to periods outside the active nesting season (generally March 1 to July 31). (WILD112-X)

Where applicable.

W28 Management of Marten Habitat: Maintain important features of forest stand structure in harvest units in order to manage high value marten habitat within units according to Forest-wide Standard & Guideline WILD112-XVI,A,2. (This applies to VCU's in high risk biogeographic provinces). (WILD112-XVI)

Units: 614-001a & b,-002,-005, 615-025, 616-011,-012,-023,-123,-275, 674-032,-537,-548,-549,-551, 675-028,-030,-032,-033,-037.

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W31 Protection of Sensitive Plant Species: Modify unit boundaries or road routing to avoid habitats supporting populations of sensitive plant species. (TE&S-II)

Unit: 616-012

W34 Wildlife Habitat Restoration or Enhancement: Conduct wildlife habitat restoration in young-growth conifer stands to accelerate development of advanced seral stand structure. Treatments may include thinning of young stands, release pruning, fertilization, or prescribed fire. (May be appropriate in high value deer or moose winter range, along beach fringe, etc.) (WILD22-I and FIRE2-I)

Potential in all units.

HERITAGE RESOURCES

H1 Avoid Direct Effects on Heritage Resource Sites: Avoid road construction or harvest unit placement in areas with heritage resource value. (HER - IV)

RECREATION AND TOURISM

R1 Access Restrictions for Recreation: Close or restrict access on roads to maintain remoteness of areas after harvest. (REC112-II)

Roads: 2170000-1, 2170000-2, 2180000-1, 2190000-1, 2190000-2

SCENERY

V1 Even-aged Clearcutting with Reserves: Reduce visual contrast with adjacent areas by using clearcutting with reserve trees (even-aged system) as a harvest prescription; does not meet two-aged criteria (see Appendix G to Forest Plan FEIS). (VIS11 - III)

Units: 614-001a,-001b,-002,-034a,-034b,-005, 616-007,-008,-010,-011,-013,-016,-018,-019,-021,-022,-023,-024,-123,-275, 617-009, 674-537,-548,-549,-550,-551,-583, 675-028,-029,-030,-031,-032,-033,-037, 676-462,-472,-484,-489,-500,-592.

V4 Two-aged Management with Reserves: Reduce visual contrast with adjacent areas by leaving reserve trees under a two-aged system as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11-III)

Units: 614-001a,-001b,-002,-034a,-034b,-005, 616-007, portions of 616-008,-012,-013,-024.

V5 Even-aged Patch or Strip Clearcutting: Reduce visual contrast with adjacent areas by using patch or strip clearcutting (uneven-aged systems) as a harvest prescription. Does not meet two-aged criteria (see Appendix G to Forest Plan FEIS). (VIS11-III)

Units: 614-001a, 616-022,-023.

V6 Uneven-aged Selection Harvest: Reduce visual contrast with adjacent areas by using the selection method (uneven-aged system) as a harvest prescription (see Appendix G to Forest Plan FEIS). (VIS11 - III)

Units: 614-002, 616-017, 674-032

V7 Leaving Non-merchantable Trees and Snags: Reduce visual contrast with adjacent areas by leaving most non-merchantable trees after harvest. (VIS11 - III)

Units: all units leave some trees and/or snags.

V8 Modification of Unit Boundaries: Modify unit boundaries to assure that the harvest unit meets the proposed VQO in partial retention and retention areas. (VIS11-II)

Units: 614-001a,-001b,-002,-034a,-034b, 615-025, 616-018,-022,-023,-024,-123, 674-032,-537,-548,-549,-550,-551,-583, 675-028,-029,-030,-031,-032, 676-462,-472,-489,-592.

V9 Treatment of Rock Sources: Locate rock sources off the roads in the project area that in future provide potential recreation opportunities and/or locate them to minimize visibility from Visual Priority boat routes or saltwater use areas, and use a landscape architect in the planning/design of rock pits. (VIS11-II)

Locate rock pits off future recreation roads: 2180000-1, 2180000-2.

Locate and design rock pits to minimize visibility from Visual Priority boat routes and saltwater use areas and from Monie Lake and Swan Lake: 2170000-1,-2, 2170100, 2180000-3,-4, 2180300, 2180700, 2190000-1,-2.

V11 LTF Design: Use low profile LTF design to minimize visibility from Visual Priority Travel Routes and Use Areas. (VIS11-II)

All LTF's

V13 Exceed Visual Quality Objectives: VQO's met are higher than Forest Plan adopted VQO's in most of the alternatives at the project key access points.

Units: 614-001a,-001b,-002,-034a,-034b, 616-010,-022,-23,-024,-123, 675-028,-029,-030, 676-462,-472,-484,-489,-500,-592.

V14 Sort Area Design: Design sort yard and road to minimize visual impact. Could include vegetative buffer screen along beach, road alignment adjustment, and/or re-establishment of vegetation.

Clover Bay and McKenzie Inlet LTF's.

SUBSISTENCE

S1 Access Restrictions for Subsistence: Close or restrict access on roads to maintain remoteness of areas after harvest to address subsistence issues. (SUB-I)

Roads: 2170000-1, 2170000-2, 2180000-1, 2190000-1, 2190000-2

II. Mitigation Measures by Unit and Alternative

For each site-specific mitigation measure listed above, the tables on the next pages indicate the units and alternatives to which the measure applies.

Table D-1: Site-Specific Mitigation Measures

Unit	AI2	AI3	AI4	AI5	M1	M2	K1	K2	K3	F1	F3	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20
614-001a		X	X	X	X	X				X			X						X				X				X
614-001b	X	X	X	X	X	X				X			X						X								
614-002	X	X	X	X	X	X				X	X								X								
614-034a	X	X	X	X	X	X				X	X								X				X				
614-034b	X	X	X	X	X	X				X	X								X				X				
614-005	X	X	X	X	X	X				X	X								X				X				
615-025	X	X	X	X	X	X				X	X								X				X				
616-007	X	X	X	X	X	X				X	X								X				X				
616-008	X	X	X	X	X	X				X	X								X				X				
616-010	X	X	X	X	X	X				X									X								X
616-011	X	X	X	X	X	X				X									X				X				
616-012	X	X	X	X	X	X				X	X		X						X								
616-013	X	X	X	X	X	X				X									X				X				
616-016	X	X	X	X	X	X				X	X								X				X				
616-017	X	X	X	X	X	X				X									X								
616-018	X	X	X	X	X	X				X									X								
616-019	X	X	X	X	X	X				X									X				X				
616-021	X	X	X	X	X	X				X	X		X						X				X				
616-022	X	X	X	X	X	X				X	X								X				X				
616-023	X	X	X	X	X	X				X	X								X				X				
616-024	X	X	X	X	X	X				X	X								X				X				
616-123	X	X	X	X	X	X				X	X								X								
616-275	X	X	X	X	X	X				X	X								X				X				
617-009	X	X	X	X	X	X				X									X								
674-032	X	X	X	X	X	X		X		X									X								
674-537	X	X	X	X	X	X				X									X								
674-548	X	X	X	X	X	X				X	X								X				X				
674-549	X	X	X	X	X	X				X									X				X				
674-550	X	X	X	X	X	X													X				X				
674-551	X	X	X	X	X	X					X								X				X				
674-583	X	X	X	X	X	X				X	X								X				X				
675-028	X	X	X	X	X	X				X			X						X								X
675-029	X	X	X	X	X	X				X			X						X								X
675-030	X	X	X	X	X	X				X	X								X				X				
675-031	X	X	X	X	X	X				X									X								
675-032	X	X	X	X	X	X		X											X								
675-033	X	X	X	X	X	X				X	X								X				X				
675-037	X	X	X	X	X	X				X	X								X				X				
676-462	X	X	X	X	X	X				X									X				X				
676-472	X	X	X	X	X	X				X									X				X				
676-484	X	X	X	X	X	X													X				X				
676-489	X	X	X	X	X	X													X				X				
676-500	X	X	X	X	X	X													X				X				
676-592	X	X	X	X	X	X					X																

Table D-1: Site-Specific Mitigation Measures

Unit	Alt2	Alt3	Alt4	Alt5	M1	M2	K1	K2	K3	F1	F3	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20
Roads																											
21700001		X	X	X								X	X		X	X				X							
21700002		X	X	X										X	X	X				X							
21700003		X	X	X										X	X	X				X							
2170450		X	X	X											X	X				X							
21800001		X	X	X								X	X		X	X				X							
21800002		X	X	X											X	X				X							
21800003		X	X	X								X			X	X				X							
21800004		X	X	X											X	X				X							
2180100		X	X	X											X	X				X							
2180150		X	X	X											X	X				X							
2180200		X	X	X											X	X				X							
2180300		X	X	X											X	X				X							
2180310		X	X	X											X	X				X							
2180320		X	X	X											X	X				X							
2180400		X	X	X											X	X				X							
2180600		X	X	X											X	X				X							
2180700		X	X	X											X	X				X							
21900001		X	X	X									X			X				X							X
21900002		X	X	X											X	X				X							X
2190100		X	X	X												X				X							

Table D-1: Site-Specific Mitigation Measures

Unit	F21	F26	T1	T2	T4	T5	W1	W4	W5	W6	W7	W8	W9	W13	W20	W28	W31	W33	W34	H1	R1	V1	V4	V5	V6
614-001a	X				X		X		X		X					X						X	X	X	
614-001b	X				X		X				X						X					X	X		
614-002	X				X		X			X	X				X		X					X	X		X
614-034a	X				X		X				X											X	X		
614-034b	X				X		X				X											X	X		
614-005	X				X		X				X						X					X	X		
615-025	X		X								X						X								
616-007	X				X		X	X			X											X	X		
616-008	X				X		X	X			X									X		X	X		
616-010	X				X		X				X									X		X			
616-011	X		X		X		X				X						X					X			
616-012	X				X			X			X						X	X					X		
616-013	X				X		X	X			X											X	X		
616-016	X				X		X				X											X			
616-017	X				X					X	X														X
616-018	X						X				X											X			
616-019	X						X				X											X			
616-021	X						X				X											X			
616-022	X						X		X		X											X			
616-023	X						X		X		X						X					X			
616-024	X						X	X			X											X	X		
616-123	X						X				X						X					X			
616-275	X						X				X						X					X			
617-009	X				X		X				X											X			
674-032	X									X	X						X								X
674-537	X						X				X						X					X			
674-548	X						X				X						X					X			
674-549	X		X								X						X					X			
674-550	X		X								X						X					X			
674-551	X		X								X						X					X			
674-583	X						X				X											X			
675-028	X						X				X						X					X			
675-029	X						X				X											X			
675-030	X						X				X						X					X			
675-031	X						X				X											X			
675-032	X						X				X						X					X			
675-033	X		X				X				X						X					X			
675-037	X						X				X						X					X			
676-462	X						X				X											X			
676-472	X						X				X											X			
676-484	X						X				X											X			
676-489	X						X				X											X			
676-500	X						X				X											X			
676-592	X						X				X											X			

Table D-1: Site-Specific Mitigation Measures

Unit	F21	F26	T1	T2	T4	T5	W1	W4	W5	W6	W7	W8	W9	W13	W20	W28	W31	W33	W34	H1	R1	V1	V4	V5	V6
Roads																									
21700001	x					x							x								x				
21700002	x					x							x								x				
21700003	x																								
2170450	x																								
21800001	x					x							x								x				
21800002	x																								
21800003	x																								
21800004	x																								
2180100	x																								
2180150	x																								
2180200	x																								
2180300	x																								
2180310	x																								
2180320	x																								
2180400	x																								
2180600	x																								
2180700	x																								
21900001	x					x							x								x				
21900002	x					x							x								x				
2190100	x																								

Table D-1: Site-Specific Mitigation Measures

Unit	V7	V8	V9	V11	V13	V14	S1
614-001a		X			X		
614-001b		X			X		
614-002		X			X		
614-034a		X			X		
614-034b		X			X		
614-005							
615-025		X					
616-007							
616-008							
616-010					X		
616-011							
616-012							
616-013							
616-016							
616-017							
616-018		X					
616-019							
616-021							
616-022		X			X		
616-023		X			X		
616-024		X			X		
616-123		X			X		
616-275							
617-009							
674-032		X					
674-537		X					
674-548		X					
674-549		X					
674-550		X					
674-551		X					
674-583		X					
675-028		X			X		
675-029		X			X		
675-030		X			X		
675-031		X					
675-032		X					
675-033							
675-037							
676-462		X			X		
676-472		X			X		
676-484					X		
676-489		X			X		
676-500					X		
676-592		X			X		

Table D-1: Site-Specific Mitigation Measures

Unit	V7	V8	V9	V11	V13	V14	S1
Roads							
21700001			X				X
21700002			X				X
21700003							
2170450							
21800001			X				X
21800002			X				
21800003			X				
21800004			X				
2180100							
2180150							
2180200							
2180300			X				
2180310							
2180320							
2180400							
2180600							
2180700			X				
21900001			X				X
21900002			X				X
2190100							

Table D-2: BMP Mitigation in Project Units

Unit	Alt2	Alt3	Alt4	Alt5	12.5	12.6	12.6a	13.2	13.5	13.9	13.16	14.2
614-001a	X	X	X	X	X	X	X	X	X	X	X	
614-001b	X	X	X	X	X	X	X	X		X	X	
614-002	X	X	X	X	X	X	X	X	X	X	X	
614-034a	X	X	X	X		X	X	X	X	X	X	
614-034b	X	X	X	X	X	X	X	X	X	X	X	
614-005	X	X	X	X	X	X	X	X	X	X	X	
615-025	X	X	X	X	X	X	X	X	X	X	X	
616-007	X	X	X	X	X	X	X	X	X	X	X	
616-008	X	X	X	X	X	X	X	X	X	X	X	
616-010	X	X	X	X	X	X	X	X	X	X	X	
616-011	X	X	X	X	X	X	X	X	X	X	X	
616-012	X	X	X	X	X	X	X	X		X	X	
616-013	X	X	X	X	X	X	X	X	X	X	X	
616-016	X	X	X	X	X	X	X	X	X	X	X	
616-017	X	X	X	X	X	X	X	X		X	X	
616-018	X	X	X	X	X	X	X	X		X	X	
616-019	X	X	X	X	X	X	X	X	X	X	X	
616-021	X	X	X	X	X	X	X	X	X	X	X	
616-022	X	X	X	X	X	X	X	X	X		X	
616-023	X	X	X	X	X	X	X	X	X	X	X	
616-024	X	X	X	X	X	X	X	X	X	X	X	
616-123	X	X	X	X	X	X	X	X	X	X	X	
616-275	X	X	X	X	X	X		X	X	X		
617-009	X	X	X	X	X	X	X	X		X	X	
674-032	X	X	X	X	X	X	X	X		X	X	
674-537	X	X	X	X	X	X	X	X	X	X	X	
674-548	X	X	X	X	X	X	X	X	X	X	X	
674-549	X	X	X	X	X	X	X	X		X	X	
674-550	X	X	X	X	X	X	X	X	X	X	X	
674-551	X	X	X	X	X	X	X	X	X	X	X	
674-583	X	X	X	X	X	X	X	X		X	X	
675-027	X	X	X	X	X	X	X	X	X	X	X	X
675-028	X	X	X	X	X	X	X	X	X			
675-029	X	X	X	X	X	X	X	X	X	X	X	
675-030	X	X	X	X	X	X	X	X	X	X	X	
675-031	X	X	X	X	X	X	X	X	X	X	X	
675-032	X	X	X	X	X	X	X	X	X	X	X	
675-033	X	X	X	X	X	X	X	X	X	X	X	
675-037	X	X	X	X	X	X	X	X	X	X	X	
676-462	X	X	X	X	X	X	X	X	X	X	X	
676-472	X	X	X	X	X	X	X	X	X	X	X	
676-484	X	X	X	X	X	X	X	X	X	X	X	
676-489	X	X	X	X	X	X	X	X	X	X	X	
676-500	X	X	X	X	X	X	X	X	X	X	X	
676-592	X	X	X	X	X	X	X	X		X	X	

Table D-3: BMP Mitigation on Project Roads

Roads	Alt2	Alt3	Alt4	Alt5	12.5	12.8	13.2	14.2	14.3	14.5	14.6	14.7	14.8	14.9	14.10	14.11	14.12	14.14	14.17	14.18	14.19	14.20	14.22	14.25
21700001		X	X	X	X	X	X	X			X	X	X	X		X		X						X
21700002		X	X	X	X	X	X	X			X	X	X	X	X		X	X		X	X			
21700003		X	X	X	X	X	X	X				X		X			X			X				
2170450		X	X	X		X	X					X		X			X			X				
21800001			X	X		X	X	X	X				X	X		X								
21800002		X	X	X	X	X	X	X					X				X				X			
21800003		X		X		X	X	X			X	X					X				X			
21800004		X		X	X	X	X					X					X				X			
2180100		X	X	X	X	X	X					X					X				X			
2180150		X	X	X	X	X	X										X				X			
2180200		X	X	X	X	X	X										X				X			
2180300		X	X	X	X	X	X	X				X					X				X			
2180310		X	X		X	X	X	X				X												
2180320		X	X		X	X	X	X				X					X				X			
2180400		X			X	X	X					X		X		X	X		X		X			
2180600		X			X	X	X					X					X				X			
2180700		X			X	X	X					X					X				X			
21900001		X	X		X	X	X			X	X	X	X	X	X	X	X	X	X		X			
21900002		X	X		X	X	X					X					X				X			
2190100		X	X			X	X					X		X			X				X	X	X	

Appendix E

Biological Assessments and Evaluations

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

Experiments

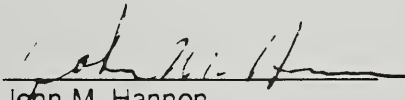
Experiments

Experiments

Cholmondeley Timber Sale

Biological Assessment
for the
Endangered Humpback Whale and
Snake River Sockeye Salmon
and Threatened Steller Sea Lion, Snake
River Spring/Summer/Fall Chinook
Salmon
for the Tongass National Forest
May 2000

Prepared By: Marla Dillman
Biological Technician-Wildlife, Craig Ranger District

Approved By:  Date: 11-2-00
John M. Hannon
Fish and Wildlife Staff Officer, Craig Ranger District, Tongass National
Forest

Biological Assessment

Cholmondeley Timber Sale

This Biological Assessment (BA) was prepared for the Cholmondeley Timber Sale as required by Section 7 of the Endangered Species Act (ESA) as amended and the USDA Forest Service threatened, endangered, and sensitive plant and animal species policy (FSM 2670). This document examines the potential impacts of the Cholmondeley Timber Sale on the humpback whale and Steller sea lion. The National Marine Fisheries Service (NMFS) concurred with the Forest Service finding that the Forest Plan would not likely adversely affect listed species under the jurisdiction of NMFS (see previous BA dated April 1992). This update includes consideration of only the humpback whale as likely to occur in coastal waters possibly affected by the proposed action.

Identification of Endangered and Threatened Species and/or Critical Habitats for Such Species Within the Project Area.

The following species were identified by NMFS as possibly occurring within the Project Area and are considered in this document.

Endangered:

Humpback Whale	<i>Megaptera novaeangliae</i>
Snake River Sockeye Salmon	<i>Onocorhynchus nerka</i>

Threatened:

Steller Sea Lion	<i>Eumetopias jubatus</i>
Snake River Spring/Summer Chinook Salmon	<i>Onorhynchus tshawytscha</i>
Snake River Fall Chinook Salmon	<i>Onorrhynchus tshawytscha</i>

The NMFS completed a final recovery plan for the humpback whale in 1991 and the Steller sea lion in 1992.

There has been no critical habitat officially designated for the whales at this time in Southeast Alaska. Critical habitat was designated for the Steller sea lion by NMFS in 1993 and represents areas considered essential for the continued survival and recovery of the species (NMFS 1993). Critical habitat provides notice to Federal agencies that a species is dependent on these areas for its continued existence and that any Federal action that may affect these areas is subject to consultation requirements of Section 7 of the Endangered Species Act (ESA). Critical habitat at these sites includes a 3,000-foot distance landward and seaward from the rookery or haulout site. It also includes a 3,000-foot elevation air zone above these terrestrial and aquatic zones. The sites that have been designated in Southeast Alaska include, but are not limited to, Cape Addington and Coronation Island. Both these sites are 50 or more miles from the Cholmondeley Project Area.

E Appendix

Overview of Species Distributions, Populations and Habitats.

The following summary of the whales was developed using information provided by the NMFS final recovery plans for the humpback whale and Steller sea lion, and document summarizing the ecology of the humpback whales and Steller sea lions titled "Background Biological Information for Humpback Whales and Steller Sea Lions" (NMFS, Anonymous undated), and information contained in the NMFS proposed rule to reclassify the Steller sea lion (NMFS, 1995).

Humpback Whale

Humpback whales (*Megaptera novaeangliae*) are regularly sighted in the Inside Passage and coastal waters of the southeastern Alaskan Panhandle from Yakutat south to Queen Charlotte Sound. Humpback whales feed in Southeast Alaskan waters from about May to December, although whales have been seen in every month of the year. Peak numbers of whales are usually found in nearshore waters during late August and September, but substantial numbers will remain until early winter.

The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and euphausiids. Important feeding areas include Glacier Bay and the adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal and Sitka Sound. Glacier Bay and Icy Strait appear to be important feeding areas early in the season, when whales prey heavily on herring and other small schooling fish. Frederick Sound is important later in the summer when whales feed on swarming euphausiids. During autumn and early winter, humpbacks move out of the sound to areas where herring are abundant particularly Seymour Canal. Other areas of Southeast Alaska may be important for humpbacks as well but these areas have not been evaluated. These areas include Cape Fairweather, Lynn Canal, Sumner Strait, Dixon Entrance, the west coast of Prince of Wales Island and offshore banks such as the Fairweather Grounds.

Humpback whale population estimates in Southeast Alaska range from 374 (+/- 47, 95% confidence interval), (Baker et al., 1986) to 547(+/- 43, 95% confidence interval), (Baker et al., 1992).

Because the humpback inhabits shallow coastal waters, it is increasingly exposed to human activity. Consequently, these whales may be more susceptible to confrontational disturbance, displacement and loss of habitat from environmental degradation than some other whale species.

Humpbacks summering in Southeast Alaska have been linked to each of three wintering areas in Mexico, Hawaii and Asia.

Steller Sea Lion

The Steller sea lion (*Eumetopias jubata*) ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, Gulf of Alaska, Southeast Alaska and south to central California. The centers of abundance and distribution are the Gulf of Alaska and Aleutian Islands. The number of sea lions observed on certain rookeries from the Kenai Peninsula to Kiska Island declined by 63% since 1985 and by 82% since 1960. The declines are spreading to previously stable areas and are accelerating. Significant declines have also occurred on the Kuril Islands, USSR. Causes of the population declines are unknown.

In 1995 the NMFS published a proposed rule to recognize two distinct populations of the Steller sea lions, a western population (west of 144 degrees west longitude) and an eastern population, generally east of Cape Suckling and including Southeast Alaska. Identification of the two populations was based on genetic analysis. The proposed rule further recommended that the western population be reclassified, due to the continued precipitous declines, from threatened to endangered.

The only Steller sea lion rookery in Southeast Alaska is on Forrester Island, 50 miles or more from the Cholmondeley Project Area.

Snake River Chinook (all stocks)

The Snake River Chinook are not known to inhabit the marine waters of the Tongass National Forest but may occur in the marine waters on the outside coast to the west of the Tongass. Because Chinook salmon are piscavores they may feed on fish which are dependent on the waters of the Tongass National Forest during some stage of their lives, or these prey species may be effected by the development of log transfer facilities. Additionally, Chinook salmon are harvested in the sport and subsistence fisheries which may utilize the Tongass National Forest for saltwater access.

Snake River Sockeye

The Snake River sockeye do not occur within the marine waters of the Tongass National Forest but may occur in the adjacent waters along the western, outside, boundary of the Tongass. British Columbia and Washington sockeye stocks normally occur south of Southeast Alaska sockeye stocks below the latitude 46 degrees (Burner, Robert L., *in* Pacific Salmon Life Histories, C. Croot and L. Marcolis, eds., UBC Press, 1991). Because sockeye salmon are primarily planktivores they are not generally taken in saltwater sport or subsistence harvest.

Assessment of Effects on the Population or Habitats of the Species In Relation to Proposed Actions of the Cholmondeley Timber Sale

Humpback Whale

The recovery plan for the humpback whale identified six known or potential categories of human impacts to these species: hunting, entrapment and entanglement in fishing gear, collisions with ships, acoustic disturbances, habitat degradation and competition for resources with humans.

National Forest management activities which may have an effect on whale habitats or populations generally fall into the categories of acoustic disturbances and habitat degradation. These management activities include: the development and use of log transfer facilities and their associated camps, the movement of log rafts from the transfer facility to mills, and the potential development of other docks and associated facilities for mining, recreation and other Forest uses and activities. Generally with the development and use of LTF's and other facilities for projects there is an increase in recreational boating in the immediate vicinity during the construction and use of the facilities.

Construction and operation of LTF's and other docking facilities are restricted to small, very localized areas of the marine environment. There are currently no LTF's in the Cholmondeley Project Area. Up to three LTF's are planned for the Cholmondeley Timber Sale.

Generally there is no reasonable potential to directly affect whales with these facilities. During the summer of 1989 there was a report of a humpback whale entangled in some cables from an inactive LTF site on the Stikine Area. To our knowledge this is the only direct effect incident related to LTF's.

Two potential effects of LTF's and other docking facilities and associated activities have been identified: 1) effects on whale prey species and 2) disturbances of whales by boat traffic associated with LTF's.

E Appendix

Effects on Prey

Nemoto (1970) noted that euphausiids and gregarious fish are the primary prey of humpback whales. Thirteen species of fish and 57 species of invertebrates were identified as prey species in Southeast Alaska. Humpbacks studied in Glacier Bay and Stephens Passage-Frederick Sound were found most frequently in areas of high prey concentrations (Wing and Krieger, 1983).

Construction and operation of all LTF's and similar facilities require U.S. Army Corps of Engineers and U.S. Environmental Protection Agency permits and State of Alaska Tidelands permits. The permitting process provides that construction and operation maintain water quality in the specific facility locations, and that marine circulation and flushing are maintained. All facilities must be in conformance with permit standards. No impacts to the marine environment that would affect whale prey species are anticipated.

Effects from Disturbance

Humpback whale response to nearby boating activity varies from no apparent response to pod dispersal, sounding, breaching, evasive underwater maneuvers and maintaining distance (Baker and Herman 1983, Baker et al., 1982). Disturbance by boat activity has been suggested as one of the possible causes of observed changes in whale distribution in Southeast Alaska. Direct pursuit of whales by boats and frequent changes in boat speed and direction appear to elicit avoidance behaviors more frequently than other types of boat traffic. However, whales may readily habituate to constant and familiar noise (Norris and Reeves 1978). Whales can commonly be found in some areas of Southeast Alaska that have considerable boat traffic; however, whether they have become habituated to the boat traffic or not has not been documented. Adverse effects from the current levels of boat traffic have not been documented as far as we know.

Two basic types of boat traffic would be associated with the LTF's: 1) log raft towing and 2) the recreational boating by workers. Log raft towing frequency would vary between camps, seasons and years; a general average may be about once a week during the working season (USFS 1989-94 Operating Period for the Ketchikan Pulp Company Long-Term Sale Area). Tugs would maintain relatively constant speeds and directions during log raft towing. Constant speed and direction elicit less avoidance behavior from whales than other types of boating activity. Log raft towing routes are generally well established and the adverse effects from log raft towing have not been documented.

Recreational boating activity would vary between seasons, years and camps of different sizes. This activity would be concentrated near the LTF sites, other docking facilities and camps. It is estimated that most of the recreational boating would occur within a few miles of the site, few trips would be over 10 miles and activity greater than 30 miles from the site would be negligible. This boating would involve frequent changes in speed and direction and may include some small amount of whale pursuit. The effect of such recreational boating on whales would depend on many factors such as the size of the bay, depth of the water, number of boats, and individual behavior responses of the whales. At the present time there is no way to quantify these possible effects.

Forest-Wide Standards and Guidelines have been developed for all Forest Service permitted or approved activities, to minimize or eliminate any adverse impacts on humpback whales.

The amount of human activity in the marine environment associated with Forest management activities is the only a fraction of the total amount of human activity occurring there. Some of the other activities include commercial fishing, sport fishing, subsistence, tourism and mariculture. The Forest Service does not regulate many of these activities. The NMFS is currently proposing regulations for how close humans can approach whales. The purpose of such regulations is to reduce the disturbance to whales from activities such as whale pursuit. Such regulations would also reduce the indirect disturbance effects discussed above.

Based upon implementation of these Forest-wide management Standards and Guidelines, national forest management activities are not likely to directly or indirectly adversely effect humpback whales.

Steller Sea Lion

The NMFS provides a summary of factors affecting the Steller sea lion (NMFS 1990, 1993). These factors include: reductions in the availability of food resources (especially pollock, which is the most important prey species of the sea lion); commercial harvests of the sea lion pups; subsistence harvests of sea lions; harvests for public display and scientific research purposes; predation by sharks, killer whales and brown bears; disease; the inadequacy of existing regulatory mechanisms regarding quotas on the incidental harvesting of sea lion during commercial fishing operations; other natural or man-made factors such as incidences of fisherman shooting adult sea lions at rookeries, haulout sites, and in the water near boats. None of these factors are regulated or fall under the jurisdiction of the Forest Service.

Southeast Alaska sea lion populations have not declined to the extent of other populations. Harassment or displacement of sea lions from their preferred habitats by human activities such as boating, recreation, aircraft, log transfer facilities, log raft towing, etc. is a concern with regard to long-term conservation of the sea lion in Southeast Alaska. Forest-wide Standards and Guidelines direct the Forest Service to prevent or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service. These Standards and Guidelines are listed in Chapter 4 of the Forest Plan.

Based on the implementation of these Standards and Guidelines, national forest management activities are not likely to directly or indirectly adversely affect the Steller sea lion.

Salmon

The Forest Service has no authority over the direct taking of salmon. This responsibility rests with the State of Alaska, Board of Fisheries and the Department of Fish and Game. As a land management agency the Forest Service may indirectly influence the take of fish, both on and adjacent to national forest land. Indirect take may occur as a result of modification of habitat or improving the opportunity to harvest salmon. Examples of the latter include the development of roads, boat launches, saltwater anchorages, cabin construction, special use permits for lodges, guides and outfitters and logging camp development for the purpose of timber harvest. The following analysis considers the potential opportunity for indirect take of the Snake River sockeye salmon (endangered), Snake River spring/summer Chinook (threatened) and the Snake River fall Chinook salmon (threatened).

Snake River Chinook

Aquatic habitat protection measures have been designed to provide a natural range of habitat conditions in the waters of the Tongass National Forest (Riparian Forest-wide Standards and Guidelines) and have been developed to reduce or eliminate the likelihood or contribution to the degradation of freshwater habitats. Chinook prey species, such as members of the Pacific smelt family and other Pacific salmon are not anticipated to be negatively impacted. Log transfer facilities could disrupt the natural ecology of some prey species in very limited areas. The small area impacted, less than 0.1 % of the Tongass shoreline, is not considered to be significant habitat and would not measurably impact the Chinook prey base.

The Tongass National Forest Land Management Plan does not schedule any developments that measurably increase the access or opportunity to harvest Snake River Chinook salmon by sport or subsistence fisheries. Additionally it is likely that such projects that could be developed in the future

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such as roads, boat launches, saltwater anchorages, cabins, special use permits for lodges, guides and outfitters, and logging camp development for the purpose of timber harvest would have no measurable effect on the Chinook salmon.

Snake River Sockeye

Due to both the lack of presence in the Tongass National Forest habitats and the lack of availability to sport and subsistence fisheries accessed through the Forest, revision of Tongass National Forest Land Management will not likely adversely affect the Snake River sockeye salmon.

The management of the Tongass National Forest has no direct effect on the take of the Snake River sockeye salmon, the Snake River spring/summer or fall Chinook salmon. There is only a very limited relationship between the life history of these salmon and the management of the terrestrial habitats of the Tongass National Forest.

Determination

Based upon the analysis presented, the Cholmondeley Project will not likely adversely affect the humpback whale, Steller sea lion, Snake River sockeye salmon, or the Snake River Chinook (all stocks) or their habitats.

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Documentation of Correspondence with Other Agencies

Sept. 1, 1987: Forest Service letter to NMFS requesting list of T & E species.

Sept. 11, 1987: Reply from NMFS with list of T & E species.

Feb. 6, 1987: State of Alaska endangered species list.

Aug. 15, 1989: Phone conversation with NMFS requesting information and data for whales and other marine mammals.

April 2, 1990: Phone conversation with NMFS about the status of recovery plans for whales and designation of critical habitat.

April 5, 1990: NMFS publishes in the Federal Register emergency listing of the Steller sea lion as a threatened species.

May 31, 1990: Meeting with NMFS about the emergency listing of the Steller sea lion as a threatened species; also discussed guidelines/regulations being developed by NMFS on minimum approach distances.

Aug. 22, 1990: Biological Assessment transmitted to NMFS and ADF&G for their review.

Aug. 30, 1990: Phone conversation with NMFS clarifying portions of the Biological Assessment.

Sept. 4, 1990: Reply from NMFS on their review of the Biological Assessment.

Sept. 20, 1990: Letter to NMFS thanking them for their review of the Biological Assessment.

Sept. 25, 1990: Reply from ADF&G on their review of the Biological Assessment.

Dec. 4, 1990: NMFS publishes final rule in Federal Register listing the Steller sea lion as a threatened species.

April 8, 1992: Phone conversation with NMFS about the status of recovery plans for the Steller sea lion and whales and the proposed regulations for approaching marine mammals.

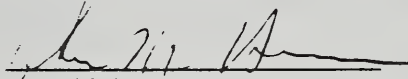
Sept. 11, 1992: Letter to NMFS requesting a list of species that must be considered for Section 7 ESA consultation for TLMP Revision Final EIS.

Sept. 25, 1992: Letter from NMFS Dr. Zimmerman) to TLMP Planning Team (Chris Iverson) identifying species listed under the ESA that should be considered in the Biological Assessment for the Tongass Land Management Plan Revision.

Cholmondeley Timber Sale

Biological Assessment
for the
American Peregrine Falcon
for the Tongass National Forest
May 2000

Prepared By: Marla Dillman
Biological Technician-Wildlife, Craig Ranger District

Approved By:  Date: 1-2-00
John M. Hannon
Fish and Wildlife Staff Officer, Craig Ranger District, Tongass National
Forest

Biological Assessment

Cholmondeley Timber Sale

This Biological Assessment (BA) was prepared for the Cholmondeley Timber Sale as required by Section 7 of the Endangered Species Act (ESA) as amended and the USDA Forest Service threatened, endangered, and sensitive plant and animal species policy (FSM 2670). This document examines the potential impacts of the Cholmondeley Timber Sale on the American Peregrine falcon. This falcon is primarily associated with interior Alaska, where it nests, breeds and rears its young. The American peregrine falcon is highly migratory, wintering as far south as Argentina. This species of falcon only occurs in Southeast Alaska during the migration period, between its wintering habitat in South American and the interior of Alaska where it spends the summer. Population numbers are on the increase (Ambrose et al., 1988). The U.S. Fish and Wildlife Service (USFWS), made a proposal in August 1998 to remove the peregrine falcon from the list of threatened and endangered species. The comment period was extended to January 23, 1999, and after reviewing any additional data the USFWS will make a final determination on the status of the peregrine falcon. If the species is removed from the threatened and endangered list the USFWS still requires that the species be monitored for at least the next five years. The Arctic peregrine falcon was delisted in 1994.

Identification of Endangered and Threatened species and/or Critical Habitats for Such Species Within the Project Area.

In a letter dated August 28, 1996, the USFWS identified the American peregrine falcon (*Falco peregrinus anatum*) as the only listed species that may occur in the Tongass National Forest Project Area. This endangered species is the only one that is considered in this Biological Assessment for the purposes of Section 7 consultation requirements pursuant to the Endangered Species Act.

<u>Common Name</u>	<u>Scientific Name</u>	<u>ESA Status</u>
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	Endangered

Overview of Species Distributions, Populations and Habitats.

The American peregrine falcon is primarily associated with the interior of Alaska for breeding, nesting and rearing of young; it is a highly migratory species wintering as far south as Argentina (Ambrose et al., 1998). It occurs in Southeast Alaska only during the migration periods to and from wintering and nesting grounds. Population numbers in Alaska are continuing to increase (ADF&G letter dated February 6, 1987, Ambrose et al., 1988). The USFWS is considering delisting the American peregrine falcon; reproduction is increasing and populations are up three-fold (minutes of an Interagency Wildlife Technical Committee Meeting of March 29, 1991).

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Assessment of Effects on the Population or Habitats of the Species In Relation to Proposed Actions of the Cholmondeley Timber Sale

Peregrine Falcons

The primary reason for the past declines in peregrine falcon populations was the proliferation of organochlorine pesticides, especially DDT and its principle metabolite DDE (Ratcliff, 1969; Peskall, 1976; Cade, et al., 1971; Peskall and Kiff, 1979; USFWS, 1982). No organochloride pesticides are authorized for use on the Tongass National Forest.

The American peregrine falcon subspecies may occur on the Tongass National Forest within the Cholmondeley Project Area as a transient, primarily during seasonal migration periods. During migration, the availability and abundance of prey species will most likely be the primary habitat factor affecting the peregrine falcons. In coastal areas of Washington, the primary prey species for the peregrine falcon were shorebirds, waterfowl species, and passerines (Anderson and Debrun, 1979; Anderson, et al., 1980). It is assumed that the food sources would be similar for coastal Alaska.

Peregrine falcons forage over open sites such as bodies of water, marshes, grasslands, shorelines and over wooded area. Peregrines attack flying prey from above or by chasing them. Although they forage over wide areas, they also have preferred foraging sites (White, 1974).

Actual migration routes and patterns, and foraging areas have not been identified in Southeast Alaska.

Forest-wide Standards and Guidelines have been developed for protecting seabird rookeries and waterfowl concentration areas (Forest Plan, Chapter 4). A wide variety of passerine birds will be available from a wide variety of open and forested communities under all alternatives. Adverse effects on American falcon populations or their habitats are not anticipated with any management activities associated with the Cholmondeley Project.

Relationship with other Agencies and Plans

The USFWS has responsibility for the threatened and endangered species of peregrine falcons. Recovery Plans have been developed for the Pacific States peregrine falcon populations but do not include Alaska (USFWS, 1982).

Determination

Based on this analysis the Cholmondeley Project will not likely adversely affect the American peregrine falcon.

In addition, formal and informal consultation (as directed by the Endangered Species Act, as amended, CFR 17.7, and Forest Service Manual 2670) are used with the USFWS on all projects within areas thought to be used by peregrine falcons. Forest-wide Standards and Guidelines for threatened and endangered species (Forest Plan, Chapter 4) direct all projects to follow requirements of the Endangered Species Act and Forest Service Policy (FSM 2670).

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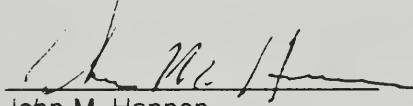
Cholmondeley Timber Sale

Biological Assessment and Biological Evaluation

Threatened, Endangered, and Sensitive Species

May 2000

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Cholmondeley Timber Sales Draft EIS

Appendix E

Environmental Impact Statement

Cholmondeley Timber Sales Draft EIS

Appendix E

Environmental Impact Statement

Biological Assessment and Biological Evaluation

Cholmondeley Timber Sale

This combined Biological Assessment (BA) and Biological Evaluation (BE) was prepared for the Cholmondeley Timber Sale as required by Section 7 of the Endangered Species Act (ESA) as amended and the USDA Forest Service threatened, endangered, and sensitive plant and animal species policy (FSM 2670). This document describes the occurrence of and project effects on species that are federally listed or proposed for threatened or endangered status. This document also serves as a BE by including equivalent information on Forest Service sensitive species. The BE is not required under ESA, but is required by the Forest Service for all internal programs and activities (FSM 2672.4).

Identification of Endangered and Threatened species and/or Critical Habitats for Such Species Within the Project Area

Federal Threatened and Endangered Species

Threatened and endangered species potentially occurring in the project area were identified through consultation with the US Fish and Wildlife Service and the National Marine Fisheries Service. Consultation correspondences will be located in the Cholmondeley Project Planning Record. Table 1 lists the threatened and endangered species that may occur in or near the project area.

Table 1. Threatened and Endangered Species that may occur in or near the Cholmondeley Project Area.

Common Name	Scientific Name	ESA Status	Summary of BA/BE Finding
Humpback whale	<i>Megaptera novaeangliae</i>	Endangered	No effect
Steller sea lion	<i>Eumetopias jubatus</i>	Threatened	No effect
Snake River sockeye salmon	<i>Onchorhynchus nerka</i>	Endangered	No effect
Snake River spring/summer Chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
Snake River fall Chinook salmon	<i>Onchorhynchus tshawytscha</i>	Threatened	No effect
American peregrine falcon	<i>Falco peregrinus anatum</i>	Endangered	No effect

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Forest Service Sensitive species

The Forest Service has identified sensitive plant and animal species that could potentially occur in or near the project. Table 2 lists sensitive species that may occur in the Cholmondeley Project Area.

Table 2. Alaska Region Sensitive Species that may occur in the Cholmondeley Project Area.

Common Name	Scientific Name	Summary of BA/BE Finding
Trumpeter swan	<i>Cygnus buccinator</i>	Not likely to adversely affect
Queen Charlotte goshawk	<i>Accipiter gentilis laingi</i>	May affect individuals, not likely to adversely affect population viability
Osprey	<i>Pandion haliaetus</i>	No effect
Peale's peregrine falcon	<i>Falco peregrinus pealei</i>	No effect
Goose-grass sedge	<i>Carex lenticularis</i> var. <i>dolia</i>	No effect
Edible thistle	<i>Cirsium edule</i>	No effect
Davy mannagrass	<i>Glyceria leptoctachya</i>	No effect
Wright filmy fern	<i>Hymenophyllum wrightii</i>	May affect individuals, not likely to adversely affect population viability
Truncate quillwort	<i>Isoetes truncata</i>	No effect
Calder lovage	<i>Ligusticum calderi</i>	No effect
Choris bog orchid	<i>Platanthera chorisiana</i>	This species has been removed from the sensitive plant list.
Bog orchid	<i>Platanthera gracilis</i>	No effect
Loose-flowered bluegrass	<i>Poa laxiflora</i>	May affect individuals, not likely to adversely affect population viability
Straight-beak buttercup	<i>Ranunculus orthorhynchus</i> var. <i>alaschensis</i>	This species has been removed from the sensitive plant list.
Queen Charlotte butterweed	<i>Senecio moresbiensis</i>	Not likely to adversely affect

Other Species

The U.S. Fish and Wildlife Service and the Forest Service have identified the following species as ones in which they are interested. These species are not currently formally listed. The information on these species is provided to aid the Fish and Wildlife Service in their efforts to track these species. The one species that continues to be an issue is the Alexander Archipelago wolf. The wolf is not discussed here in the BE but is covered extensively in the wildlife section of Chapter 3 of this EIS.

Field Surveys

BOTANICAL SURVEYS

Field assessment for the Cholmondeley Project Area occurred in 1997. A Forest Service botanist spent eleven days on the ground surveying the Cholmondeley Project Area. Many of the field personnel had knowledge of plants as well and were equipped with sensitive plant identification cards and asked to report any sensitive plants seen during the course of other duties.

Surveys in 1997 followed the "Inventory Protocols for Sensitive and Rare Plants for the Ketchikan Area." The protocol calls for use of the "Intuitive Controlled Meander" survey method, the standard method for botanical surveys on national forest lands. The protocol also states that botanists "will survey at least 25% of the harvest unit pool, plus 75% of the segments of potential roads to be constructed outside of the units for timber sale assessments." In 1997, a botanist surveyed 11 of 46 proposed harvest units (23.9%) and 3.75 miles of road, out of a total of 33.44 miles (11.2%). The 23.9% was very close to the required 25%. The road surveys, however, fell well short of the requirement: 11.2% surveyed instead of 75%. This was due largely to the fact that the road locations were not flagged in at the time of the surveys. The detailed methods and results of botanical surveys, along with maps of the transect routes, can be found in the Planning Record (Phyllis A. Woolwine, October 1997 report).

During prefield review, units and roads were selected for surveying according to two criteria. Units and roads were prioritized based on their probability for harvest. Aerial photos were then examined for high-likelihood sensitive plant habitats in and adjacent to the units and roads.

GOSHAWK SURVEYS

The objective of goshawk surveys in the project area was to locate goshawk nest sites. Knowledge of nest site locations allows goshawks to receive more accurate consideration during project alternative development and analyses. Standards and Guidelines will be applied to any discovered nests.

Goshawk surveys followed the Alaska Region Goshawk Inventory Protocol first issued June 24, 1992. In the summer of 1997, a combination of survey methods was used. The chances of observing a goshawk were increased if more time was spent sitting at an overlook and observing an area of good habitat. This technique was used in conjunction with the traditional method of broadcasting recorded goshawk calls while walking through units and other habitat. Although these inventory techniques are the best currently available, there is still a high likelihood that nests were missed even in the stands (units) which were walked. We suspect that nests may not be found, even if surveys are conducted close to a nest site.

Broadcast and overlook surveys were completed on 75 points in the Cholmondeley Project Area in 1997. Of the 45 potential units, 39 (87%) contained at least one broadcast or overlook station. A total of 7,610 acres were surveyed. Field crews found no goshawk nests and had no audio detections. Plucked feathers were found at two different locations in the Sunny Creek watershed but these areas were repeatedly surveyed with no detections.

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INCIDENTAL OBSERVATIONS

There are a number of other species potentially in the project area about which we wanted to know more information, but did not feel species-specific surveys were justified or cost effective. Some species have Forest Plan Standards and Guidelines while others are U.S. Fish and Wildlife Service Species of Concern or Region 10 sensitive species.

The objectives of recording incidental observations were:

- 1) To be able to update the existing database (for example: trumpeter swans, marine mammal haulouts, etc.)
- 2) To document key sites, such as dens or nests, that were discovered within the project area.
- 3) To supplement data collected during protocol surveys.

We encouraged all field-going personnel to report wildlife observations through the use of standard wildlife observation cards and discussions with wildlife biologists. Listed below are the species that we encouraged people to report immediately so biologists could follow up on the reports as soon as possible.

Osprey	Great blue heron rookeries
Goshawk	Peregrine falcons
Marbled murrelet eggs or nests	Spotted frogs
Large (12" - 36") stick nests (not eagles)	

Listed below are additional species we encouraged all crews to report. Timeliness of the report was less critical for these species. We did not follow up visits for most of these observations.

Trumpeter swans	Whales
Harlequin ducks	Wolf dens, sightings, or howling
Canada geese	Bear dens or concentrations
Sandhill cranes	Band-tailed pigeons
Olive-sided flycatcher	Bald eagle nests

This method of field survey is useful in documenting the presence of a species, but does not document the absence of a species or the density of a species. Many undiscovered individuals or nests can occur in the area.

Threatened and Endangered Species Assessments

Humpback Whale (*Megaptera novaeangliae*)

Humpback whales are the most abundant of the seven species of endangered whales that occur in Southeast Alaska waters. As a result of the humpback being the most abundant of the species, most of the information and data for all whales in Southeast Alaska is associated with it. The other seven species of whales are either present only seasonally as they migrate along the outer coastal areas, or are only occasionally found in the inside coastal waters of Southeast Alaska. An eighth species, the gray whale, was delisted effective June 16, 1994. The humpback population in the North Pacific is estimated to be about 1,200, which is estimated to be about 8 percent of the prewhaling population. These whales are regularly sighted in the Inside Passage and coastal waters of the Southeast Alaska panhandle from Yakutat Bay south to Queen Charlotte Sound. Humpback whales feed in Southeast Alaska waters from about May through December, although they have been seen in every month of the year. Peak numbers of whales are usually found in nearshore waters during late August and September, but substantial numbers usually remain until early winter. Baker et al. (1985) estimate that 300-350 humpback whales inhabit Southeast Alaska during the summer and fall.

The following discussion and analysis is primarily based on humpback whales, but is assumed to be applicable to the other species of whales.

The local distribution of humpbacks in Southeast Alaska appears to be correlated with the density and seasonal availability of prey, particularly herring (*Clupea harengus*) and *euphausiids*. Important feeding areas include Glacier Bay and adjacent portions of Icy Strait, Stephens Passage/Frederick Sound, Seymour Canal and Sitka Sound. Glacier Bay and Icy Strait appear to be an important feeding area early in the season, when whales prey heavily on herring and other small, schooling fishes. Frederick Sound is important later in summer, when whales feed on swarming *euphausiids*. During autumn and early winter, humpbacks move out of the sound to areas where herring are abundant, particularly Seymour Canal. Other areas of Southeast Alaska may also be important for humpbacks and need to be evaluated. These areas include: Cape Fairweather, Lynn Canal, Sumner Strait, Dixon Entrance, the west coast of Prince of Wales Island, and offshore banks such as the Fairweather Grounds.

Because the humpback inhabits shallow coastal areas, it is increasingly exposed to human activity. Consequently, these whales may be more susceptible to confrontational disturbance, displacement, and loss of habitat from environmental degradation than some other whale species. Humpbacks summering in Southeast Alaska have been linked to three different wintering areas: Mexico, Hawaii, and Japan.

The recovery plans for the humpback whale identified six known or potential categories of human impacts to these species: hunting, entrapment and entanglement in fishing gear, collisions with ships, acoustic disturbance, habitat degradation, and competition for resources with humans.

National Forest management activities that may have an effect on whale habitats or populations generally fall into the categories of acoustic disturbance and habitat degradation. These management activities include: the development and use of log transfer facilities (LTF's) and their associated camps, the movement of log rafts from log transfer facilities to mills, and the potential development of other docks and associated facilities for mining, recreation, and other forest uses and activities. Generally, with the development and use of LTF's and other docking facilities for projects, there is an

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associated increase in recreational boating in the immediate vicinity during the construction and use of the facilities.

Construction and operation of LTF's and other docking facilities are restricted to small, very localized areas of the marine environment. There are currently no LTF's in the Cholmondeley Project Area, but three are planned in the Cholmondeley DEIS: one each in Sunny Cove, Clover Bay and McKenzie Inlet.

There is little potential to directly affect whales with these facilities. During the summer of 1989, there was a report of a humpback whale entangled in some cables from an inactive LTF site on the Stikine Area. This is the only known direct incident related to LTF's on whales.

Two potential indirect effects of LTF's and other docking facilities and associated activities have been identified: 1) effects on whale prey species, and 2) disturbances of whales by boat traffic associated with LTF's.

Effects on Prey

Nemoto (1970) noted that *euphausiids* and gregarious fish are the primary prey of humpbacks. Thirteen species of fish and 57 species of invertebrates have been identified as humpback whale prey in Southeast Alaska. Humpbacks studied in Glacier Bay and Stephens Passage-Frederick Sound were found most frequently in areas of high prey density (Wing and Krieger 1983).

Construction and operation of all LTF's and similar facilities require U.S. Army Corps of Engineer and U.S. Environmental Protection Agency permits, and State of Alaska tideland permits. The permitting process provides that construction and operation maintain water quality in the specific facility locations, and that marine circulation and flushing are maintained. All facilities must be in conformance with permit standards. Although the effects may vary locally, the major effect of leachates (i.e. terpene, alpha-conindentric acid, alpha-conindentrin, hydroxymatairesinol, linoletic acid, and dehydroabientic acid) from stored log rafts, is upon invertebrates. Crustaceans, shrimp, and crab larvae seem especially sensitive (Pease 1973, Buchanan and Tate 1976). EPA measuring techniques may be required to monitor the LC50 levels at each LTF (Peltier and Weber 1985) in order to insure impacts are limited to the approved "zone of deposit." A local increase in the herring and herring egg fishery could also impact this food item.

Effects from Disturbance

Humpback whale response to nearby boating activity varies from no apparent response to pod dispersal, sounding, breaching, evasive underwater maneuvers, and maintaining distance (Baker and Herman 1983, Baker et. al. 1982). Disturbance by boat activity has been suggested as one of the possible causes of observed changes in whale distribution in Southeast Alaska. Direct pursuit of whales by boats, and frequent changes in boat speed and direction, appear to elicit avoidance behaviors more frequently than other types of boat traffic. However, whales may readily habituate to constant and familiar noise (Norris and Reeves 1978). Whales can be commonly found in some areas of Southeast Alaska that have considerable boat traffic. Whether they are habituated to boat traffic or not has yet to be documented. Adverse effects, if any, from current levels of boat traffic need to be documented as well.

Two basic types of boat activity associated with LTF's are log raft towing and recreational boating by workers. Log raft towing frequency would vary between camps, seasons, and years, with an average of about once a week during the working season (U.S.D.A. Forest

Service 1989). Tug boats maintain relatively constant speeds and directions during log raft towing. Constant speed and direction seen to elicit less avoidance behavior from whales than other types of boating activity. Log raft towing routes are generally well established, but adverse effects from log raft towing have not been documented.

Recreational boating activity by camp residents would vary between seasons, years, and camp size. This activity would be concentrated near LTF sites, other docking facilities, and camps. It is estimated that most recreational boating would occur within a few miles of the site, few trips would be made over 10 miles, and activity greater than 30 miles from a site would be negligible. This boating would involve frequent changes in speed and direction and may include some small amount of whale pursuit, if the whales are within sight of the camp or an occupied boat. The effect of such recreational activity on whales would depend on many factors such as size of the bay, depth of the waters in the bay, number of boats, individual behavior responses of the whales, etc. At the present time, there is not a quantifiable way to estimate these possible effects.

The following Forest-wide Standards and Guidelines have been developed for the Tongass Land Management Plan Revision (1997) and are incorporated into the Cholmondeley EIS by reference:

1. Provide for the protection and maintenance of whale habitats.
2. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and National Marine Fisheries Service regulations for approaching whales, dolphins, and porpoise. "Taking" of whales is prohibited; "taking" includes harassing or pursuing or attempting any such activity.

No adverse effects on whales from implementation of Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but compliance with Forest Service and NMFS Standards and Guidelines should partially mitigate any adverse effects on whales resulting from the proposed timber sale alternatives. The Forest Service has no control over the routes taken by tugboats with log rafts, nor does the Forest Service control recreational boating activities.

Steller Sea Lion (*Eumetopias jubata*)

The Steller (northern) sea lion ranges from Hokkaido, Japan, through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, Gulf of Alaska, Southeast Alaska, and south to central California. The centers of abundance and distribution are the Gulf of Alaska and the Aleutian Islands, respectively. In 1990, because of a population decline observed over the last 31 years (primarily in the former Soviet Union, Gulf of Alaska, and Aleutian Islands), the NMFS listed the Steller sea lion as a threatened species throughout its range. The number of sea lions observed on certain rookeries from Kenai Peninsula to Kiska Island declined by 63 percent since 1985 and by 82 percent since 1960. Significant declines have also occurred on the Kuril Islands.

There is sufficient information to consider animals in different geographic regions as separate populations. The Stellar sea lion populations are currently divided into two distinct subpopulations. The western population, which ranges west of Cape Suckling, is listed as endangered, and the eastern population which occurs in Southeast Alaska is listed as threatened (NOAA and NMFS; 50 CFR parts 222 and 227; effective date 4 June 1997).

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Information on population trends in Southeast Alaska is sketchy, but what data does exist suggests that Southeast populations are stable or perhaps slightly decreasing.

The cause of overall population declines has not been confirmed. However, incidental mortality of sea lions in commercial fishing gear, shooting by fishermen, and reduced prey species due to commercial fishing operations, have probably contributed significantly to declines (Reeves et al. 1992).

When the sea lion was given emergency listing as a threatened species in the Federal Register (April 5, 1990), buffer zones restricting human activities were established around rookeries west of 150 degrees west longitude (this does not include Southeast Alaska). The closest Steller sea lion rookery to the Cholmondeley Project Area is on Forrester Island, approximately 50 miles to the west. A sea lion haulout, used for sunning and resting, occurs on Grindall Island, near the south tip of Kasaan Peninsula (about 5 miles northeast of the Project Area). This area is not designated as critical habitat. A recovery team has prepared a final recovery plan for the sea lion (effective December 1992).

Important food resources include walleye pollock, salmon, eulachon, and cephalopod mollusks. Steller sea lions forage predominantly in nearshore areas and over the continental shelf.

The NMFS provides a summary of factors affecting the Steller sea lion (Federal Register April 5, 1991). These factors include reductions in the availability of food resources, especially pollock, which is the most important prey species for sea lions; commercial harvests of sea lion pups; harvests for subsistence and for public display and scientific research purposes; predation by sharks, killer whales, and brown bear; disease; the inadequacy of existing regulations regarding quotas on the incidental harvesting of sea lions during commercial fishing operations; other natural or human incidences such as shooting adult sea lions at rookeries, haulout sites, and in the water near boats. None of these factors are regulated by or within the jurisdiction of the Forest Service.

Southeast Alaska populations of Steller sea lions have not declined to the extent that other populations have. Harassment or displacement of sea lions from preferred habitats by human activities such as boating, recreation, aircraft, log transfer facilities, log raft towing, etc., is a concern with regard to long-term conservation of the sea lion in Southeast Alaska. Forest-wide Standards and Guidelines direct the Forest Service to prevent and/or reduce potential harassment of sea lions and other marine mammals due to activities carried out by or under the jurisdiction of the Forest Service, and these will be incorporated by reference into the Cholmondeley EIS from the Tongass Land Management Revision (1997). These Forest-wide Standards and Guidelines are as follows:

1. Protect Steller sea lion habitats.
2. Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and National Marine Fisheries Service guidelines for approaching seals and sea lions. Consult with the appropriate agency for identification of critical timing events, such as molting, parturition, etc., and recommended distances to avoid disturbances. "Taking" of marine mammals is prohibited; taking includes harassment, pursuit, or attempting any such activity.
3. Locate facilities, camps, LTFs, campgrounds, and other developments one mile from known haulouts, and, farther away, if the development is large.

4. Cooperate with State and other Federal agencies to develop sites and opportunities for the safe viewing and observation of marine mammals by the public. Maintain a public education program explaining Forest management activities related to marine mammals in cooperation with State and other Federal agencies.

No direct effects on sea lions from Forest management activities are anticipated. Indirect effects may be associated with possible increased boating activity, but compliance with these Standards and Guidelines should mitigate any adverse effects on sea lion populations or their habitats for any of the alternatives.

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine falcon is primarily associated with interior Alaska for breeding, nesting, and rearing of young. The falcon is highly migratory, wintering as far south as northern Argentina. The peregrine falcon occurs in Southeast Alaska during migration periods. Population numbers of the American peregrine falcon are on the increase (Ambrose, et al. 1988). In coastal areas of Washington, the primary prey for peregrine falcons were shorebirds and waterfowl species; passerines were also identified in the diet (Anderson and Debruyn 1979; Anderson et al. 1980).

The Tongass Land Management Plan (1997) contains Standards and Guidelines for protecting waterfowl and shorebird habitats. These Standards and Guidelines are incorporated into the Cholmondeley Project. Due to the fact that the project will not impact seabird rookeries or waterfowl concentrations, no adverse effects are anticipated from the project on American peregrine falcons.

Sensitive Species Evaluations

Trumpeter Swan (*Cygnus buccinator*)

The breeding range of the trumpeter swan is concentrated along the Alaska Gulf coast and other wetland areas in central and southern central Alaska (Bellrose 1980). There are no known trumpeter swan nesting pairs on the Craig Ranger District. Therefore, there are no concerns for conflicts between breeding trumpeter swans and the Cholmondeley Project. Swans have been reportedly seen in the summer on the lake south of Sallery Cove by the local residents. Swan surveys in the area by Forest Service biologists have not recorded any swans in the area, although the habitat is present. Forest Service swan surveys are done in the winter, but biologists have been in this area in the summer conducting other surveys and no swan sightings were recorded. If swans are seen within the project area, all Forest-wide Standards and Guidelines concerning swans will be applied.

Trumpeter swans breeding in Alaska winter along the Pacific Coast from the Alaska Peninsula south to the mouth of the Columbia River (Bellrose 1980). Each year, many swans pass through southern Southeast Alaska in the spring and fall as they migrate to and from their breeding grounds. Swans that spend the winter here usually move into areas of open water such as large lakes and estuaries once the weather turns cold. They

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usually arrive in the area around mid-October. Numbers increase as migration continues. Swans typically leave for their breeding area by mid-April.

The Cholmondeley Project incorporates the Forest-wide Standards and Guidelines for significant waterfowl areas, beach fringe and estuary fringe. Based on the above information, this project is not likely to adversely affect the overall swan population in Southeast Alaska.

Queen Charlotte Goshawk (*Accipiter gentilis laingi*)

The American Ornithologists Union (AOU) recognizes two subspecies of the northern goshawk in North America: *Accipiter gentilis atricapillus* and *A.g. laingi*, the Queen Charlotte goshawk (AOU 1957). Taverner (1940) first described the darker plumaged Queen Charlotte goshawk as a distinct race occurring in the coastal temperate rainforests of the Queen Charlotte Islands and Vancouver Island, British Columbia. Webster (1988) found that the Queen Charlotte goshawk occurred from Vancouver Island north to the Taku River near Juneau. The northern goshawk and Queen Charlotte goshawk are identified as Species of Concern throughout their ranges.

On May 9, 1994, the USFWS received a petition from the Southwest Center for Biological Diversity and numerous copetitioners to list the Queen Charlotte goshawk as endangered pursuant to the Endangered Species Act. On August 19, 1994, the USFWS found that the information presented by the petitioners together with the information in USFWS files was substantial and indicated that listing may be warranted. Therefore, a status review of the species was initiated. After seeking public comments and reviewing all the available information on the goshawk, a finding was issued June 28, 1995, that protection under the Endangered Species Act is not warranted at this time for the Queen Charlotte goshawk. Since that time the courts have directed the USFWS to reconsider their determination. The USFWS recently redetermined that the goshawk did not warrant listing, but this decision is also in the process of being appealed.

The goshawk is a wide-ranging forest raptor that generally occurs in low densities, from 2.4 pairs (Central Alaska, McGowan 1975) to 11.0 pairs (Arizona, Crocker-Bedford and Cheney 1988) per 100 square kilometers, although population densities in Southeast Alaska may be much lower (Crocker-Bedford 1992). The most recent estimates of the goshawk population in Southeast Alaska range from 100 to 381 pairs (USDA Forest Service 1991a; Crocker-Bedford 1994) and from 100 to 800 pairs (Alaska Interagency Goshawk Committee, Report of June 30, 1994).

The primary concern for goshawk population viability is habitat loss due to timber harvest. Recent results of studies within the range of the Queen Charlotte goshawk (ADF&G 1993, Titus et al. 1994), indicated a greater frequency of relocations of radio-tagged goshawks in mature and old-growth forest. Of 18 nest trees for which habitat attributes were characterized, 16 were in old growth and two were in second growth trees greater than 90 years of age. Of 661 radio relocations, over 90% were in habitat classified as volume class 4 or greater and 68% were in habitats classified as volume class 5 or greater (Titus et al. 1994).

Reynolds (1983) reported home ranges to be 2,000 to 3,200 hectares. These home ranges may include a mosaic of habitat types, with a strong preference for mature forest with flight space beneath the canopy (Reynolds 1989, USDA Forest Service 1990). Home range size is strongly dependent upon quality of the foraging habitat and prey availability

(Kenward 1982). Titus et al. (1994) reported breeding period home ranges for 16 adult goshawks in Southeast Alaska as large as 19,613 hectares and year-round home ranges as large as 114,728 hectares.

A recent review of the Queen Charlotte goshawk summarized habitat use as follows (Crocker-Bedford 1994):

"Analyses of habitat use have shown similar results throughout the geographical range of the northern goshawk in the United States. Home ranges include stands of large trees for nesting, as well as for greater abundance of some prey. The higher canopy provided by large trees, along with sparser than normal shrubs and small trees, appears to facilitate goshawk flight and prey capture. Closed canopies appear to provide preferred microclimate in the nesting stand, increased productivity of some important prey species, and reduced competition and predation by open-forest raptors. A literature review indicated that goshawk densities tend to decrease with the amount of timber harvest, and that goshawks may sometimes be impacted by forest fragmentation.

"In Southeast Alaska 92 percent of the relocations on radio-tagged goshawks were in old-growth forests having over 8 mbf/ac. Old-growth having over 20 mbf/ac. was the most preferred."

Goshawks generally select forest stands with large trees on gentle slopes at lower elevations for nesting and foraging (Reynolds 1989, USDA Forest Service 1990). Foraging habitat is generally characterized by a greater diversity of age classes and structural characteristics (e.g., snags, woody debris) than nesting areas; foraging areas also comprise the largest percentage of goshawk home ranges (Reynolds et al. 1991).

Goshawk sensitivity to timber harvest resulted in management recommendations to protect nest site integrity (USDA Forest Service 1990, USDA Forest Service 1991a, USDA Forest Service Alaska Region 1992 and 1994). Other management recommendations recognized the importance of the foraging area within the post-fledging area (Kennedy 1989, Crocker-Bedford 1990, USDA Forest Service 1991a, and USDA Forest Service Alaska Region 1992 and 1994). There is now widespread recognition of the importance of most foraging habitat, including areas far from the nesting site (Reynolds 1989, USDA Forest Service 1990, Crocker-Bedford 1990, 1991, 1992, 1994a and 1995, Marshall 1992, Reynolds et al. 1991, USDA Forest Service Alaska Region 1994, Iverson et al. 1996).

The value of clearcut stands for goshawk nesting or foraging is very low. Landscapes with large portions of early seral forest reduce cumulative landscape habitat quality (Assessment of the Northern Goshawk for the TLMP Revision). Harvesting of the units in the Cholmondeley Project would increase the amount of early seral forest, thus reducing the cumulative landscape habitat quality.

Since 1992, more inventory effort has been spent to find goshawks than any other animal in Southeast Alaska. Twenty-one goshawk nest areas were documented in Southeast Alaska with activity between 1990 and 1993 (Titus et al. 1994). At least one nest site was located at 18 of these areas, including 8 active nests in 1993. In 1994, a total of 33 historic and current sites with at least one nest were documented; active nests were located at 21 of these sites (ADF&G 1994). Despite searches in new locales, and following radioed birds to 5 new sites in 1995, the number of known, occupied nest sites decreased from 21 to 10 between 1994 and 1995 (Iverson et al. 1996).

No known goshawk territories are located within the project area, although the habitat is present especially in the three main watersheds (Saltery, Monie, and Sunny). There have

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been reported goshawk sightings across the West Arm in the Cannery creek drainage. Prey remains were found in the Sunny creek watershed while conducting surveys in the area in the summer of 1997. Any goshawks not discovered prior to timber harvest may be affected if the harvest units correspond to key stands of habitat. Any goshawk nest found prior to or during harvest will be protected utilizing the TLMP goshawk Standards and Guidelines. Although the buffers may be adequate if only 3% of the old growth of a drainage is harvested in any one decade (Iverson et al. 1996), the nest site will likely not be occupied long after timber harvesting if large amounts of harvest occur in the surrounding watersheds (Crocker-bedford 1990, 1991, 1994, and 1995; Patla 1991, Reynold et al. 1991, Marshall 1992, Woodbridge and Detrich 1994, Harward et al. 1995).

It is determined that this project may affect individual northern goshawks if timber harvest activities or roads correspond with goshawk nesting stands or important foraging habitats which have not been identified. This determination is based on the following factors:

- Goshawks are dependent on old-growth forest characteristics.
- Goshawks are sensitive to timber harvest, and habitat values in clearcut stands are generally very low.
- Harvesting of the units in the Cholmondeley Project would increase the amount of early seral forest, thus reducing the cumulative landscape habitat quality.

Mitigation: All units laid out for the Cholmondeley Project will follow the TLMP Forest-wide Standards and Guidelines. The Project will also follow the TLMP strategy for maintaining viable wildlife populations. It is assumed these strategies will be sufficient to maintain goshawk populations; therefore, the Cholmondeley Project is not likely to affect goshawk population viability, even if a nest should be found within the Project Area.

Osprey

(*Pandion haliaetus*)

There are no known osprey nest locations on the Craig Ranger District. Nests are usually in broken-top spruce, either live or dead, or western hemlock snags. Osprey are usually found near water since their diet consists mainly of fish.

Osprey have been known to stop at some lakes on the District during migration. The numerous small lakes in the project area provide an opportunity for migrating osprey to rest and feed. A single osprey was observed in the project area in the area near Monie Lake in the summer of 1997 (30 September 1997, Hannon, J. and S. Farzan, per. comm.).

The Cholmondeley Project is not expected to affect nesting ospreys because no known nest sites occur in the project area, and availability of nesting and foraging areas do not appear to be a factor limiting population growth. In addition, minimal or no effect on osprey habitat is expected from project activities, because uncut buffers will be maintained near streams, lakes, and coastal areas. If nests are discovered in the project area, Standards and Guidelines outlined in the Forest Plan will be followed. Based on this information, the project is not expected to adversely affect osprey.

Peale's Peregrine Falcon (*Falco peregrinus pealei*)

The Peale's subspecies of the peregrine falcon nests on the outer islands west of Prince of Wales Island. This species is not listed as endangered or threatened, but is covered by a provision of the "similarity of appearance" which broadens the scope of protection for all peregrine falcons. The nest distribution of this subspecies is closely associated with large seabird colonies, and seabirds are believed to be the major prey of the falcon.

Peregrine nest distribution is closely associated with large seabird colonies located on the outer coasts of nearby islands (USDA Forest Service 1991b). No seabird colonies or potential nesting cliffs exist in the project area. Based on this information, the project will not affect Peale's peregrine falcons or their habitat.

Goose-grass Sedge (*Carex lenticularis* var. *dolia*)

This sedge is known to occur in the coastal mountains of Alaska and British Columbia and the Rocky Mountains from Jasper, B. C., south to Glacier National Park, Montana. Its range in Alaska is limited to the alpine areas of coastal South-central and Southeast Alaska and the Aleutian Islands. In Southeast Alaska it is known from sightings at Mendenhall Glacier, Bailey Bay and the Chickamin Glacier. Its habitat is wet alpine meadows and the edges of snowbeds.

No observations of this species were made during field reconnaissance of harvest units and roads. The field reconnaissance included surveys by cross-trained IDT members as well as 11 days by a FS botanist. This species is not known to occur in forested areas and, therefore, no effects are anticipated as a result of this project.

Recent taxonomic treatment of *Carex* has added *Carex enanderi* to this taxon. Consequently, this taxon is more common, but still rare (TLMP 1997).

Edible Thistle (*Cirsium edule*)

This regionally endemic thistle is distributed primarily along coastal Oregon, Washington, and British Columbia and barely reaches southernmost Southeast Alaska. In Southeast Alaska it is known from locations in Misty Fjords National Monument (TLMP FEIS 1997). It is not expected to occur in the project area. Its habitat is characterized as wet meadows and open woods along glacial streams.

No observations of this species were made during field reconnaissance, which included 11 days of plant surveys by a FS botanist as well as surveys by crossed-trained field personnel.

Since harvest activities generally avoid wet meadows and stream margins where this species would be expected to be found, no direct effects are anticipated from the project even if the species were to occur in the project area.

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Davy Mannagrass (*Glyceria leptostachya*)

This grass species is distributed from Southeast Alaska to central California. Its distribution in Alaska is limited to central and southern Southeast Alaska. It is known to occur near Wrangell, Alaska and on Prince of Wales Island (Forest Service 1995). However, it is easily overlooked and may likely be more widespread in Southeast Alaska (USDA Forest Service 1994).

No populations of davy mannagrass were discovered within the project area during field reconnaissance, which included 11 days of surveys by a FS botanist. Because it grows in shallow fresh water and along stream and lake margins (TLMP 1997), TLMP Standards and Guidelines should protect its habitat from disturbance, should it happen to occur in the area. Therefore, no effects are anticipated from this project.

Wright Filmy Fern (*Hymenophyllum wrightii*)

This small fern species occurs in coastal areas of Southeast Alaska and British Columbia. Sightings have been documented in Alaska, but are limited to Biorka and Mitkof Islands (USDA Forest Service 1994). It is unknown if the species occurs in the project area. This species appears to prefer humid, shaded boulders, cliffs, tree trunks, and damp woods. In Alaska, it has been found in small populations on the base of trees and rock outcrops in damp woods.

Sensitive plant surveys included 11 days of field reconnaissance by a FS botanist but no observations of this species were documented for the project area. However, the habitat for the Wright filmy fern does occur within the Cholmondeley Project Area and, as a result, undetected specimens could be affected. This project may affect individuals, but is not likely to adversely affect population viability.

Truncate Quillwort (*Isoetes truncata*)

This rooted aquatic species is known from a few widely isolated populations on Vancouver Island and South-central Alaska on the Copper River Delta (USDA Forest Service 1994). It is unknown whether this species occurs in the project area. Truncate quillwort grows immersed in shallow water of lakes and ponds (TLMP 1997).

No observations of this species were made during the 1997 field reconnaissance, which included 11 days of plant surveys by a FS botanist as well as other trained field personnel. Due to its rooted aquatic nature, this species does not occur in forested areas where harvest and roading activities would be concentrated. Even if the species does exist in the project area, stream and lakeshore buffers, as well as wetland protections, should provide adequate protection for this species. Therefore, no direct effects are anticipated from this project.

Recent reevaluations of *Isoetes x truncata* reveal that the ones identified from the Sitka Ranger District were misidentifications of *Isoetes occidentalis*, which was not known to occur in Alaska. It is suspected to occur from Prince William Sound south through the Tongass National Forest. *Isoetes occidentalis* is not known to occur within the project area, but even if it does, the areas of its preferred habitat would be protected by the stream and lake buffers in the Forest Plan.

Calder's Lovage (*Ligusticum calderi*)

This plant species occurs in British Columbia, South-central and Southeast Alaska. Documented occurrences in Alaska are on Kodiak Island, Dall Island (just west of Prince of Wales Island) and on Bokan Mountain on Prince of Wales (Forest Service 1996 and 1998). These populations are in Pleistocene refugia on limestone substrate (USDA Forest Service 1994). It is unknown if this species occurs in the project area. Calder's lovage occurs on rocky cliffs, open boggy or rocky slopes, and the edges of coniferous forests. In Alaska, it is known from alpine meadow habitats and edges of subalpine mixed conifer forest, although the populations on Bokan Mountain extend down to an elevation of 50 feet.

No observations of this species were documented in the project area after 11 days of surveys by a FS botanist. Since Calder's lovage is not known to occur in the project area and its preferred habitats are areas generally not impacted by harvesting, no effects are anticipated from this project.

Choris Bog-Orchid (*Platanthera chorisiana*)

Choris bog-orchid (*Platanthera chorisiana*) is a small (6-12 cm tall), cryptic species of the orchid family (*Orchidaceae*). The Choris bog-orchid grows in bogs and muskegs at low to middle elevations. It can also be found in wet sites along streams or in moist forests (Pojar and MacKinnon 1994).

The Tongass National Forest approximates the middle range for Choris bog-orchids. Populations have been documented on the Ketchikan, Craig, and Thorne Bay Ranger Districts as well as Misty Fjords National Monument. Sites are known from the northern Tongass National Forest as well. A full summary of the sites occurring in these areas is currently not available.

On southern Prince of Wales Island, Choris bog-orchids are known from several areas on the Craig Ranger District. A number of sites for this species were documented in the project area during the 1997 field season. The Choris bog orchid was found at locations in or near units 614-001, 616-007, -008, -009, -011, -012, -017, -018, 675-029, -030, -and -462, as well as along or near roads #2170 and #2180.

On 11 May 1999, the Regional Forester signed a letter removing the Choris bog orchid from the Sensitive Plant species list. As a result of intensive surveys, numerous occurrences of this plant throughout its range were documented. The Alaska Native Heritage Program agrees that the plant is not extremely rare and they are no longer tracking its occurrences.

Bog Orchid (*Platanthera gracilis*)

This species of bog orchid is limited to a small geographic range in southernmost Southeast Alaska and adjacent British Columbia (USDA Forest Service 1994). Documented sightings have been made in Alaska near Pearse Canal and on Dall Island. It is unknown if this species occurs in the project area. No observations of this species were made during field reconnaissance, which included 11 days of plant surveys by a FS botanist. This plant occurs in wet open meadow habitat and is not known to occur in

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forested areas. Therefore, no effects are anticipated from harvest activities, even if the species should occur within the project area boundary.

Loose-flowered Bluegrass (*Poa laxiflora*)

The distribution of this grass species is scattered between Southeast Alaska and Oregon. Several sightings have been documented in Southeast Alaska near Hoonah, Sandborn Canal at Port Houghton, and Admiralty Island (USDA Forest Service 1994). Loose-flowered bluegrass is associated with moist, open, lowland woods and open-forest meadows. It is not known if this species occurs in the project area. No observations of this species were made during the 1997 field reconnaissance, which included 11 days of surveying by a FS botanist. However, undetected specimens could potentially be affected by harvest activities in open lowland woods and open-forest meadows. Therefore, this project may adversely affect loose-flowered bluegrass, but is not likely to cause a trend towards listing as threatened or endangered.

Straight-beak Buttercup (*Ranunculus orthorhynchus* var. *alaschensis*)

This species of buttercup is distributed from coastal southern Southeast Alaska to adjacent British Columbia and Vancouver Island (USDA Forest Service 1994). It occurs in moist, open, lowland meadows and other moist, open habitats. Observations of this species were made during field reconnaissance of the Cholmondeley project. However, the population was located well outside of any unit boundary or road location and was within the 1,000-foot beach buffer. Direct effects due to the removal of timber or road construction on the Cholmondeley Project are not anticipated to be significant to this species as its preferred open, moist habitats are generally avoided for these purposes.

The most recent treatment of the genus *Ranunculus* does not recognize this variety as distinct from the more common *R. orthorhynchus* var. *orthorhynchus*. The variety *alaschensis* was considered a regional endemic ranging from the central panhandle south to Vancouver Island (TLMP 1997). On 11 May 1999, the Regional Forester signed a letter which removed the straight-beak buttercup from the Sensitive Plant species list. The treatment of the genus *Ranunculus* in the Flora of North America, Volume 3, realigns this variety to be synonymous with the more common *Ranunculus orthorhynchus* var. *orthorhynchus*. Therefore, *R. orthorhynchus* var. *alaschensis* is no longer recognized as the correct name for this entity. Because *R. orthorhynchus* var. *orthorhynchus* is relatively common and wide ranging, it does not warrant sensitive designation.

Queen Charlotte Butterweed (*Senecio moresbiensis*)

This species of butterweed is limited to the Queen Charlotte Islands of British Columbia and to disjunct populations in southeastern Alaska and northwestern Vancouver Island (USDA Forest Service 1994). Occurrences have been documented in Alaska on Prince of Wales, Baker, Coronation, and Dall Islands. The Queen Charlotte butterweed occurs in shady, wet areas and bogs of montane to alpine habitats, to open rocky or boggy slopes, and in open rocky heath or grass communities (Douglas 1982 in USDA Forest Service 1994).

This species was observed during field reconnaissance for the project area. It was found in an area that was dominated by medium-tall sedge along the edge of a small bog. A population of Choris-bog orchids was also found in this wetland, as well as the uncommon *Botrychium multifidum* (leathery grape fern) and *Lycopus uniflorus* (northern bugleweed). The population of Queen Charlotte butterweed that was discovered was within a unit boundary as well as in an area considered to be a high value wetland. The proposed road location also went through the high-value wetland habitat. Direct effects due to harvest activities may occur, but the preferred open, moist habitats of this species are generally avoided for timber harvest. Both the road and unit boundary locations have been moved to avoid impacting the high value wetland area as well as the population of *Senecio*. Therefore, this project is not likely to adversely affect the Queen Charlotte butterweed.

Determination of Effects

Potential and direct impacts to plants were from road building and harvest activity. Road building may represent the most intensive source of impact as harvest sites move from lower basin areas to upper slopes. Roads that access units or connect units will likely utilize important areas of suitable habitat (e.g. muskegs, mixed-conifer stands).

Other impacts may include changes in light regime, hydrology, soil conditions, edge effect, and other site factors that may be detrimental to those populations' abilities to reproduce, disperse, or to remain viable at specific localities.

The consequence of adverse impacts to the Queen Charlotte butterweed due to project activities is moderate. This one population of the Queen Charlotte butterweed was the only location of the species found within the Cholmondeley Project Area.

Mitigation

Mitigation is necessary to lower the overall risk assessment. This can be achieved by avoiding potential and direct impacts to sensitive plant populations by delineating known areas out of proposed projects, using buffers and directional felling orders to protect plants and habitat, and moving or re-directing road locations. A USFS District Botanist or other qualified botanist shall be consulted regarding final placement of road locations and/or any other mitigation measures taken.

Discussion and Management Recommendations

Biological Evaluations and mitigation are often relied upon as environmental protection strategies. As part of the evaluation process, biologists are routinely asked to evaluate the effects of management actions on plants or animals. This evaluation often requires judgments about the viability of affected populations. Population viability analyses that are both comprehensive and scientifically sound require extensive ecological data. It has been suggested that a gross mismatch of scale between local management actions (e.g. timber sales) and geographically extensive ecological responses (e.g. species viability) reduces the reliability of environmental assessments (Ruggiero, 1993).

The Standards and Guidelines for sensitive species state that the biological evaluation (BE) will disclose the potential impacts of proposed activities on the sensitive species and will consider the direct, indirect, and cumulative effects of the proposed action. If the BE concludes that a project may have an adverse effect on the species or habitat, consult with the appropriate state and federal agencies to consider mitigation measures to reduce the effects. These measures include avoiding cumulative impacts that would contribute to further population or habitat declines and the possible need for federal listing (Forest Plan, Chapter 4, pages 89-90).

E Appendix

Monitoring study plots should be established at selected plant sites. Data collected from such sites can be useful in furthering our understanding of the natural history of these species and tracking a species response to management activities and their long-term viability in the landscape.

If any undocumented sensitive plant species is located during the execution of this project all work shall halt until a USFS District Botanist or other qualified botanist can assess potential or direct impacts.

This project, with mitigation, is not likely to cause any sensitive plant species to trend toward Federal listing.

Other Species Assessments

As stated earlier the USFWS is no longer tracking the species formerly listed as "species of concern". As a result the Forest Service is no longer including discussion of these species in the documentation. The one exception to this is the Alexander Archipelago wolf. The wolf is discussed in the Wildlife/TES section in Chapter 3 of this document.

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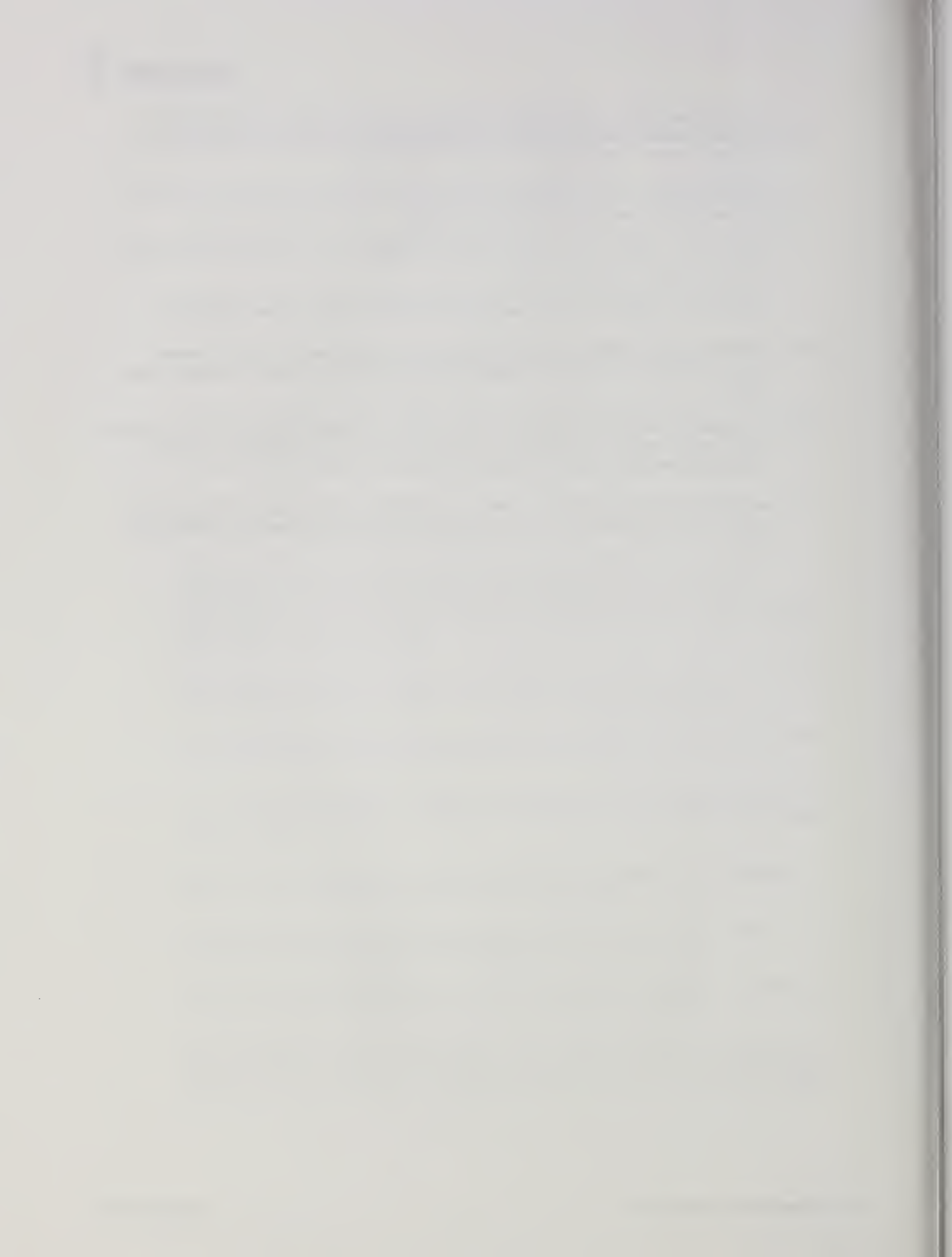
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Appendix F

LTF GUIDE AND EVALUATION

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APPENDIX F

EVALUATION OF LOG TRANSFER FACILITIES

Using 404(b)(1) Guidelines of the Clean Water Act

CHOLMONDELEY PROJECT

USDA Forest Service
Tongass National Forest

Nov. 1, 1998

F Appendix

EVALUATION OF LOG TRANSFER FACILITIES Using 404(b)(1) Guidelines of the Clean Water Act.

Guidelines governing siting, construction, operation and monitoring of log transfer facilities (LTF) under 40 CFR 230.12(a)(3) read as follows:

V. Log Transfer Facilities Siting, Construction, Operation, and Monitoring A. Site log transfer facilities in locations which will best avoid or minimize potential impacts on water quality, aquatic habitat and other resources. During site analysis, cooperate with State and Federal agencies per stipulations in Memoranda of Understanding or cooperative agreements to assemble required data and evaluate alternatives.

Evaluate alternatives using the 404(b)(1) guidelines to determine if “(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences; or (ii) The proposed discharge will result in significant degradation of the ecosystem; or (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or (iv) There does exist sufficient information to make a reasoned judgment as to whether the proposed discharge will comply with these guidelines.”

Log transfer facilities under the various action alternatives for the Cholmondeley Project were evaluated on the basis of items i through iv noted above. That evaluation is presented in subsequent discussions.

Specific Log Transfer (LTF) site locations are contained in the Log Transfer Site Reconnaissance Report located in the Planning Record.

CONSTRUCTION OF CHOM #1 LTF SITE

Includes constructing the LTF as a low angle float off ramp system with associated uplands log sorting area.

Evaluation of Alternatives.

Determine if; **(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences.**

Description:

The north side of Cholmondeley Sound contains no existing LTF's that could be used. Sunny Cove drainage area is a part of this area. The site is approximately 1/2 mile east of the mouth of Sunny Cove where it connects to Cholmondeley Sound.

The site would be developed to have minimal visual impact from the surrounding water areas. The site would be developed as a low angle ramp system costing approximately \$80,000 to construct.

The Chom #1 LTF would serve approximately 5900 acres of land in the Sunny Cove and surrounding areas of which approximately 514 acres are proposed for harvest on this project.

Alternatives to construction of Chom #1 LTF.

No action alternative: No harvest of timber resources Sunny Cove area.

Relocate LTF

Sub-alternatives to the proposed LTF modification.

Dry land transfer from bulkhead to barge

Chain slide system

A-frame lift off system

Other alternatives not demonstrated as practicable were not considered any further. For example; pile supported bridge ramp and barge or special slide out ramps etc.

Evaluation between alternatives

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to approximately 4000 acres of timber resources would be forgone.

Relocate LTF: Relocation of the LTF to other sites would create the same impacts to other undisturbed portions of the aquatic habitat. Haul and fuel use would be the same as that of the proposed site. The cost of the low-angle ramp compared with the next available site is significantly less due to the type of log transfer system. The next available site would be an A-frame type system approximately 1/4 mile to the west(Chom #5). The LTF Reconnaissance Report found in the planning record contains all LTF options looked at for each area. The USDI F&WS Field Investigation Report, found in the planning record, contains recommendations for the potential log transfer facilities. Site Chom#1 was the site recommended by the F&WS, this recommendation comes from the fact that the marine habitat has already been affected by previous activities.

F Appendix

Sub-alternatives to the proposed LTF modification

Dry Land Bulkhead to Barge Transfer: Modification of the proposed site for barge loading would require construction of a 3 to 5 acre sort yard, relocation of the access road, and expansion of the existing fill with bulkhead to deep water.

The barge system will affect 4 to 6 acres of forested wetlands, 0.2 acres of fill in aquatic habitat and cost \$250,000 more. Haul and fuel use would be about the same.

Chain Slide System: Modification to a chain slide would require relocation of the access road, and expansion of the upland operating area due to loss of the fill area. This would affect about 1.5 acres of forested wetlands and about 0.2 acres of aquatic habitat associated with fill and slide structure. Road and LTF construction costs would be about \$627,000. Fuel use and haul would be the same as the proposed action. Chain slide systems are expensive to purchase, construct and maintain.

Determine if; **(ii) The proposed discharge will result in significant degradation of the aquatic ecosystem**

Chom #1 is a proposed site that been previously affected by bark deposits. Construction and operation of a LTF at Chom -1, therefore would probably have comparatively little additional impact, and should be considered before an unimpacted site is used(USDI F&WS Field Investigation Report).

The proposed low-angle ramp system is capable of transferring logs without any significant entry velocity. This capability will minimize discharge of bark into the aquatic system.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

Determine if; **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem**

The existing site will adapt to a low angle ramp system with the least amount of impacts to both the uplands and aquatic ecosystem. The low angle ramp system is capable of eliminating entry velocities.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

The National Marine Fisheries Service and U.S. Fish and Wildlife Service recommended using the proposed Chom -1 site. See attached National Marine Fisheries and U.S. Fish and Wildlife agencies report.

Sunny Cove and surrounding area is small, resulting in short periodic use periods throughout the 100-year rotation. A low-angle ramp would be most economical for such intermittent operations, as the site would accommodate the ramp.

CONSTRUCTION OF CLOVER BAY-3(CB-3) LTF SITE

Includes constructing the LTF as a low angle float off ramp system with associated uplands log sorting area.

Evaluation of Alternatives.

Determine if; **(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences.**

Description:

Clover Bay area contains no existing LTF's that could be used. The site is approximately 1/2 mile west of the mouth of Clover Bay where it connects to Clarence Strait. The site would be developed as a low angle ramp system costing approximately \$80,000 to construct.

The CB-3 LTF would serve approximately 6400 acres of land to the North of Clover Bay and surrounding areas of which approximately 805 acres are proposed for harvest on this project.

Alternatives to construction of CB-3 LTF.

No action alternative: No harvest of timber resources Clover Bay area.

Relocate LTF

F Appendix

Sub-alternatives to the proposed LTF modification.

Dry land transfer from bulkhead to barge

Chain slide system

A-frame lift off system

Other alternatives not demonstrated as practicable were not considered any further. For example; pile supported bridge ramp and barge or special slide out ramps etc.

Evaluation between alternatives

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to approximately 5200 acres of timber resources would be forgone.

Relocate LTF: Relocation of the LTF to other sites would create the same impacts to other undisturbed portions of the aquatic habitat. Haul and fuel use would be the same as that of the proposed site. The cost of the low-angle ramp compared with the next available site is significantly less due to the type of log transfer system. The next available site would be an A-frame type system approximately 1/4 mile to the west (CB-2). The LTF Reconnaissance Report found in the planning record contains all LTF options looked at for each area. The USDI F&WS Field Investigation Report, found in the planning record, contains recommendations for the potential log transfer facilities. Site CB-3 was the site recommended by the F&WS over the other sites in the area.

Sub-alternatives to the proposed LTF modification

Dry Land Bulkhead to Barge Transfer: Modification of the proposed site for barge loading would require construction of a 3 to 5 acre sort yard, relocation of the access road, and expansion of the existing fill with bulkhead to deep water.

The barge system will affect 4 to 6 acres of forested wetlands, 0.4 acres of fill in aquatic habitat and cost \$257,000 more. Haul and fuel use would be about the same.

Chain Slide System: Modification to a chain slide would require relocation of the access road, and expansion of the upland operating area due to loss of the fill area. This would affect about 1.5 acres of forested wetlands and about 0.2 acres of aquatic habitat associated with fill and slide structure. Road and

LTF construction costs would be about \$627,000. Fuel use and haul would be the same as the proposed action. Chain slide systems are expensive to purchase, construct and maintain.

Determine if; (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem

CB-3 is a proposed site that appears to offer good potential for flushing flows to disperse bark and other debris to deep water (>18.3m). Construction and operation of an LTF at CB-3 is better suited to direct debris to the deeper waters, than others analyzed in the area.(USDI F&WS Field Investigation Report).

The proposed low-angle ramp system is capable of transferring logs without any significant entry velocity. This capability will minimize discharge of bark into the aquatic system.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

Determine if; (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem

The proposed site will adapt to a low angle ramp system with the least amount of impacts to both the uplands and aquatic ecosystem. The low angle ramp system is capable of eliminating entry velocities.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

The National Marine Fisheries Service and U.S. Fish and Wildlife Service concluded that the proposed CB-3 site would be acceptable. See attached National Marine Fisheries and US Fish and Wildlife agencies report.

Clover Bay and the surrounding area is small, resulting in short periodic use periods throughout the 100-year rotation. A low-angle ramp would be most economical for such intermittent operations, as the site would accommodate the ramp.

F Appendix

CONSTRUCTION OF N.E. McKENZIE (NEMK) LTF SITE

Includes constructing the LTF as a low angle float off ramp system with associated uplands log sorting area.

Evaluation of Alternatives.

Determine if; **(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences.**

Description:

The northeast side of McKenzie Inlet contains no existing LTF's that could be used. The site is approximately 1 and 1/2 miles south of the mouth of McKenzie Inlet, on the east side, where it connects to Skowl Arm. The site would be developed as a low angle ramp system costing approximately \$80,000 to construct.

The NEMK LTF would serve approximately 3200 acres of land in the Sunny Cove and surrounding areas of which approximately 293 acres are proposed for harvest on this project. This LTF also has the potential to serve lands recently conveyed to Sealaska Corp. in the Saltery Cove area.

Alternatives to construction of NEMK LTF.

No action alternative: No harvest of timber resources NE McKenzie area.

Relocate LTF

Sub-alternatives to the proposed LTF modification.

Dry land transfer from bulkhead to barge

Chain slide system

A-frame lift off system

Other alternatives not demonstrated as practicable were not considered any further (for example, pile supported bridge ramp and barge or special slide out ramps, etc.).

Evaluation between alternatives

No Action: The No Action alternative would eliminate the need for an LTF, thus producing no discharge of any pollutants. Accordingly, access to approximately 2200 acres of timber resources would be forgone.

.....

Relocate LTF: Relocation of the LTF to other sites would create the same impacts to other undisturbed portions of the aquatic habitat. Haul and fuel use would be the same as that of the proposed site. The cost of the low-angle ramp compared with the next available site is significantly less due to the type of log transfer system. The next available site would be and low angle ramp type system approximately 1/4 mile to the north. (NEMK-6). The LTF Reconnaissance Report found in the planning record contains all LTF options looked at for each area. The USDI F&WS Field Investigation Report, found in the planning record, contains recommendations for the potential log transfer facilities. Sites NEMK and NEMK-6 were acceptable to the F&WS, NEMK site was chosen over NEMK-6 due to the more substantial terrestrial impacts associated with the construction and operation of and LTF at NEMK-6

Sub-alternatives to the proposed LTF modification

Dry Land Bulkhead to Barge Transfer: Modification of the proposed site for barge loading would require construction of a 3 to 5 acre sort yard, relocation of the access road, and expansion of the existing fill with bulkhead to deep water.

The barge system will affect 4 to 6 acres of forested wetlands, 0.4 acres of fill in aquatic habitat and cost \$250,000 more. Haul and fuel use would be about the same.

Chain Slide System: Modification to a chain slide would require relocation of the access road, and expansion of the upland operating area due to loss of the fill area. This would affect about 1.5 acres of forested wetlands and about 0.2 acres of aquatic habitat associated with fill and slide structure. Road and LTF construction costs would be about \$627,000. Fuel use and haul would be the same as the proposed action. Chain slide systems are expensive to purchase, construct and maintain.

F Appendix

Determine if; **(ii) The proposed discharge will result in significant degradation of the aquatic ecosystem**

NEMK is a proposed site that is suitable for development of an LTF with good potential for dispersal of bark to deeper water. (USDI F&WS Field Investigation Report).

The proposed low-angle ramp system is capable of transferring logs without any significant entry velocity. This capability will minimize discharge of bark into the aquatic system.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

Determine if; **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem**

The existing site will adapt to a low angle ramp system with the least amount of impacts to both the uplands and aquatic ecosystem. The low angle ramp system is capable of eliminating entry velocities.

Surface runoff into the aquatic ecosystem will be kept to a minimum by insloping the road and LTF surface, collecting and settling runoff, and periodic surface cleanup of bark and woody debris. (40CFR 122.27 Silvicultural Point Sources; applicable to State NPDES programs, see 40 CFR 123.25).

The National Marine Fisheries Service and U.S. Fish and Wildlife Service found the proposed NEMK site to be an acceptable site for an LTF. See attached National Marine Fisheries and US Fish and Wildlife agencies report.

N.E. McKenzie and the surrounding area is small, resulting in short periodic use periods throughout the 100-year rotation. A low-angle ramp would be most economical for such intermittent operations, as the site would accommodate the ramp.

HELICOPTER TRANSFER SITES # 1 THRU #7

Includes flying logs from the harvest areas directly to a barge.

Evaluation of Alternatives.

Determine if; **(i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences.**

Description:

Helicopter transport of logs from the harvest areas to a barge eliminates the need for constructing roads on steep ground.

One area tributary to the project is designated for helicopter logging in all alternatives considered. This area will require sites #'s 1 & 2. All other sites will be used only in other alternatives as designated for helicopter harvest.

Alternatives to Helicopter transfer system.

No action alternative: No harvest of timber resources for areas scheduled for helicopter harvest.

Construct roads to the harvest areas and haul timber to newly constructed LTF's.

Evaluation between alternatives

No Action: The No Action alternative would eliminate the need for any harvest, thus producing no discharge of any pollutants. Accordingly, access to up to 1900 acres of timber resources would be forgone.

.....

Construct roads to the harvest areas and haul timber to newly constructed LTF's.

The road alternative will construct roads in all cases on oversteepened slopes, cause for construction of new LTF's and would have high impacts, due to massive full bench areas and mass failures, to the visual qualities.

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Determine if; **(ii) The proposed discharge will result in significant degradation of the aquatic ecosystem**

Helicopter transfer of logs from the harvest area directly to barge minimizes impacting the shallow high value marine habitat near the shoreline. The need for fill in the aquatic ecosystem is eliminated by using this system.

Landing logs on a barge will eliminate discharge of bark into the aquatic ecosystem. periodic cleaning of the barge deck would minimize surface runoff into the aquatic ecosystem.

Determine if; **(iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem**

The helicopter transfer system will create the least impact to both the uplands and aquatic ecosystems. The need for filling in the aquatic habitat and surface runoff control is eliminated by use of this system.

The use of helicopter transfer for isolated harvest areas is preferable to developing a land LTF or connecting to other LTF sites as it will minimize both upland and aquatic ecosystem impacts and costs. Development of roads and the LTF would be uneconomical for the amount of timber volume being harvested in isolated areas.

Surface runoff into the aquatic ecosystem will be kept to a minimum by periodically cleaning the barge deck of bark and woody debris.

Appendix G

SAI PLAN

Dr. M. S. S. S. S. S.

Dr. M. S. S. S. S.

Appendix G

Natural Regeneration Surveys and Certification

Objective:

Monitor the occurrence of natural regeneration stocking following harvest. Area direction in FSH 2409.17 calls for stocking levels of 300 trees/ac. with 60% stocked plots after the fifth growing season after final harvest. These surveys will be conducted on harvest units. Units are expected to be harvested between 1999 and 2005. The stand will be certified as regenerated if 300 conifer seedlings per acre area established on 60% of a harvest unit. Work will also include data input into SIS, updating GIS, and SAI plan and prescription modifications to reflect stand changes. This work is required NFMA.

Treatment:

Surveys will be conducted three (3) growing seasons following harvest to assure that satisfactory levels of natural stocking have been achieved. Assumes 2002 as the midterm of the harvest areas, surveys would be conducted after the 2004 growing season.

Cone Collection

Objective/Justification:

To collect an adequate amount of seed from the appropriate seed zones to accomplish required artificial regeneration. Seed will be collected from phenotypically superior trees which exhibit desirable characteristics in form, height, branch angle, resistance to insects and disease, etc. Planting of 102 acres of Alaska yellowcedar will require (102 acres X 200 TPA) 20,400 seedlings. Approximately 40,000 seedlings can be produced per pound of clean seed. Therefore .5 pounds of clean seed or 2.5 bushels (5 bushels/pound seed) of cones must be collected. This should be rounded to 3 bushels assuming poor cone years. Cone collection will occur in moderate or good cone collecting years based on field surveys. Collections will be done by force account crews in the fall after the cones have matured. Collection will involve identifying phenotypically superior trees, felling the tree, picking, cleaning, and bagging the cones, tagging the bags, and transporting the cones to Petersburg where the seed will be stored until needed.

Artificial Reforestation

Objective/Justification:

Alaska yellowcedar will be interplanted on approximately 102 acres to maintain species diversity within the stands. Natural Alaska yellowcedar restocking is unlikely because of: limiting distance of seed dispersal (300-400 feet); infrequent cone crops and low germination rates; lack of advance regeneration under the old growth canopy due to shade intolerance; competition from other coniferous seedlings and heavy slash accumulations due to low volume stands. Planting will occur mainly on high elevation low-quality sites where yellowcedar occupies a portion of the site. Alaska yellowcedar 1-0 seedlings grown from local seed will be used. Planting is planned to occur in 2002, and will include updating SIS/GIS and SAI Plan and prescriptions modifications to reflect stand changes.

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The sites to be planted fall under three general categories:

1. Floodplains and Alluvial Fans- These areas usually have deep, well drained soils with poorly developed horizons due to periodic flooding. Mature stands rarely support more than 100-150 stems per acre.. Species composition is primarily spruce growing on raised hummocks. Perturbation results in heavy brush (alder, salmonberry, and devils club) competition that will delay natural regeneration and suppress tree growth for a period of 5 to 20 years following harvest. The vast majority of the Tonowek and Tuxekan soil series have been excluded from harvesting in recent years. No harvest is proposed on large areas of these sites, however small inclusions may need regeneration established by artificial means. Existing sites will be planted with Sitka spruce or cedar depending on original stocked mixture.
2. Dense Brush or Inadequate Seed Source- Sparsley stocked sites with an established ground cover of dense vegetation such as salmonberry or devils club will retard stocking and growth for at least 5 - 10 years. Sites lacking a satisfactory seed source, including high elevation sites, sites adjacent to muskegs or lakes and immature stands where natural regeneration cannot be assured or even reasonably expected within 5 years after harvest, will be planted with Sitka spruce or cedar.
3. Somewhat Poorly Drained to Poorly Drained Soils, Low Productivity Cedar Sites- These sites currently support decadent, low-quality sawtimber with cedar making up at least 10 percent of the canopy. Getting natural cedar regeneration on these sites is unlikely because:
 - a. Cedar has limited capabilities to disperse seed over long distances from the parent tree. Alaska-cedar seed dispersion is limited to 300-400 feet.
 - b. Alaska cedar is not a prolific seed producer. Cone crops are infrequent and germination rates are low.
 - c. Unlike "down-south" cedar, southeast Alaska cedar display a greater degree of intolerance to shade. Local cedar is unable to regenerate under its own canopy and advance cedar reproduction is generally absent on the forest floor.
 - d. Low-volume cedar stands often result in heavy slash accumulation which can inhibit natural reproduction.

Therefore, planting of western red cedar and/or Alaska-cedar to improve productivity and maintain tree species diversity, shall be addressed in the silvicultural prescription for cedar stands.

Treatment: Floodplains/alluvial fans and dense shrub/inadequate seed source planting areas will be planted with 1-0 Sitka spruce stock. The low productivity/Cedar sites will be planted with 1-0 western red cedar or Alaska-cedar. Generally a mixture of western red cedar and Alaska yellow cedar will be planted on sites below 800 feet in elevation on North and East Aspects, and below 1000 feet on South and West aspects. Cedar sites with elevations above those listed have been scheduled for Alaska yellow cedar planting only.

Needs/Cost: The direct cost of planting is \$350.00 per acre. See enclosed detailed listing of stands requiring treatment/alternative.

$$\text{\$350.00/acre} \times 1.04^{>5} (1.217) = \text{\$4255.95} \times 1.5112(\text{OH}) = \text{\$643.70/acre}$$

Plantation 1st Year Survival Exam

Objective/Justification:

The 102 acres anticipated for planting on this project area will be examined after the first growing season after planting. The exam will determine seedling survival, growth, and the need for replanting and reforestation certification. Stake rows will be established to measure the survival. The costs also include data input into SIS, updating GIS, and SAI plans and prescription modifications to reflect stand change. This work is required by NFMA.

Plantation 3rd Year Survival Exam and Certification

Objective/Justification:

The 102 acres surveyed from the 1st year survival exam will be exam in the 3rd growing season after planting. Using the same stake rows from the 1st year exam and certification if unit is full stocked.

Timber Harvest Evaluation

Objective/Justification:

Harvest evaluations are desired to assess implementation success of prescriptions and effects on regeneration when using alternative harvest methods. The use of harvest techniques which incorporate selection harvest methods, retention of overstory structure, leave islands and leave strips has been limited in Southeast Alaska to date. The degree of success in implementing such prescriptions should be evaluated in order to determine how effective these prescriptions are in meeting multiple goals and objectives. If implemented properly and found to be successful in meeting goals and objectives, such prescriptions could be applied on a much broader basis to meet goals and objectives for ecosystem management.

Treatment:

Harvest evaluation will be performed by a certified silviculturist or those specifically training for the task under the direction of a certified silviculturist. Treatments which incorporate selection harvest methods, residual tree retention, leave areas, leave islands, or other non-clearcut treatments will be evaluated as soon after harvest as practical, within two years of harvest completion. Evaluations will consist of a walkthrough or quick plot stand examination of treatment area during which measurements will be taken which will provide a basis for comparisons between expected and actual treatment results. If the prescriptions called for leaving 42 merchantable trees per acre, measurements would be taken for comparison with what was prescribed and anticipated. The prescription will be used as a baseline for comparison with actual on the ground results. Emphasis should be placed on evaluating why merchantable trees, intended for retention, were damaged or lost. A harvest evaluation report will be produced which compares prescriptive treatments and expected results with implemented treatment and actual results. Recommendations for adjusting future prescriptions, where appropriate, will be included in such reports.

Release

Objective/Justification: Remove high numbers of poor form or diseased submerchantable hemlock whips.

Soils prescriptions for units call for partial suspension on high mass movement index MMI = 3 soils during yarding operations (very high mass movement index MMI = 4 soils are no longer considered suitable). In some cases, many undesirable residuals remain standing following partial or full suspension yarding. Hemlock residuals diseased with mistletoe can re-infect the new regeneration if they are allowed to remain in the stand. Residuals are often of poor form, may contain heart rot, or are damaged during logging and therefore, rarely contribute to the volume of the new stand. When in great numbers, residuals will compete for growing space and can result in a loss in volume at the end of the next rotation.

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Region 10 has no contractual requirement for the logger to sever residual trees. Removing hemlock residuals (mistletoe infected, poor form, or damaged) as part of a precommercial thinning treatment has not been very successful because of widely fluctuating funding and targets for PCT.

Treatment: Sever the hemlock residuals following harvest. As a rule, about 20 to 30 percent of the acres, which require partial or full suspension, will need the residuals severed (on certain plant associations).

Needs/Cost: Hemlock residuals will require severing of mistletoe infected stems at a direct cost of \$200.00 per acre.

$$\$200.00/\text{acre} \times 1.04^{>5} (1.217) = \$243.40 \times 1.5112 (\text{OH}) = \$367.83/\text{acre}$$

Recreational Fisheries Development in the Monie Lake Area

Objective/Justification:

Monie Lake and the lakes south of Monie Lake contain resident populations of cutthroat and dolly varden. This area has been identified as a potential recreational fishing area for Ketchikan area residents. The road system would be left open from the LTF in Clover Bay to the bridge crossing west of Monie Lake. Access would be needed for people to get from the road system to the lakes to utilize the fishing opportunities. (KV funding could not be used for this project).

Treatments:

Trail brushing/construction: Low grade trails would be provided from the road system to each of the three lakes south of Monie Lake and to Monie Lake itself. This would provide easier access to the lakes than trying to hike through logged areas.

Fisheries evaluation: Fisheries surveys would be conducted in each lake to determine size distributions of the fish populations and catch per unit effort. These should be conducted prior to trail construction to ensure that a quality fishing experience is possible at the lakes.

Cost:

Approximately 1 3/4 mile of low grade trails: \$25,000

Fisheries evaluation: \$14,000

Watershed Stabilization and Rehabilitation

Objective:

Minimize timber harvest related introduction of sediment into fish habitat and provide future woody debris sources to the streams and floodplains.

The project is to stabilize and rehabilitate harvest-activity initiated sediment sources within the units and along roads which are no longer the responsibility of the purchaser to treat.

The majority of slides normally occur within a 5 to 10 year period after cutting or roading from the following combined impacts:

1. Harvesting on steep slopes.
2. Storms with high winds and intense rainfall.
3. Where roots of severed trees have lost their holding strength in 3 to 5 years.

Other sediment sources can be from road cut-slopes, stream crossings, bared soil in harvest units, or slumps along streams.

Treatment:

If landslides or other sediment sources are identified, they will be stabilized by planting grasses and/or herbaceous vegetation, modifying roadbeds or stream crossings, or placing logs or rocks. Future woody debris sources would be provided by tree planting. Follow up monitoring will be done after initial rehabilitation to insure stabilization has been accomplished.

Needs/ Costs: \$15,000 for evaluation, treatment, and monitoring.

Erosion Control Monitoring

Objective/Justification:

To monitor the treatments planned above in watershed stabilization and rehabilitation. Follow-up monitoring is planned for two (2) years after initial rehabilitation to insure stabilization has been accomplished.

Fish Passage Enhancement

The stream below unit 616-022 (watershed F34A) contains good fish habitat. Cutthroat, dolly varden, and sticklebacks are present in the watershed. A cascade falls at saltwater apparently is a barrier to anadromous fish as no coho were present. The lowest cascade falls is about 6' high at high tide. A 6' diameter boulder inhibits passage. There is another 8' high cascade just upstream. 5' diameter boulders on the cascade create turbulence so that it is a potential barrier as well. There is another 4' high chute upstream that would probably not be a barrier. Finally there is a 3'-4' high falls about 200' up from saltwater. A log could be removed from the top and it would lower it about 1'. It should be possible to obtain passage here with some blasting, i.e. there is definitely enhancement potential so the system was classified as Class I. It was surprising that salmon are not in there now. There is no intertidal spawning habitat in the stream.

Modification of the boulders on the cascade falls would allow a coho run and possibly a sockeye run to develop in the watershed. Bioenhancement would be required because there is no existing run. Project benefits versus costs at the present time would probably be low because there is a limited amount of coho rearing habitat and spawning habitat near the lake for sockeye is very limited. Projected returns would be in the range of a couple hundred coho and about a hundred sockeye a year. The current recommendation is to maintain information on this activity as a potential future project. Fish values and economic conditions at the present time do not warrant implementation. The stream has been classified as class I because there is potential for enhancement. No anadromous fish currently use the watershed.

Estimated Cost: \$30,000

Precommercial Thinning

Objective:

1) The objective of precommercial thinning is: 1) Increase timber yields by delaying the occurrence of competition for growing space between fast growing young trees. The site's wood growing potential is distributed over a few trees instead of many. This results in larger diameter stems over a shorter time span. 2) Increase the stand's spruce composition and ultimate yield and value through favoring spruce as future crop trees. 3) Remove the deformed, diseased trees. 4) And, prolong the understory vegetation for wildlife use by delaying crown closure.

Second-growth stands in Southeast Alaska suffer from excessive competition for light because of large number of young trees that invade a clearcut. Because hemlock and spruce are shade tolerant the young stands have low mortality rates and trees do not express strong dominance in the first half of a rotation. Significant natural thinning through competition occurs late in the stand's life. Precommercial thinning will

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result in larger diameter trees over shorter time periods, increase sawlog yields about 10-12 %, and reduce rotation length by 10 to 20 years. Thinning may occur on approximately 1375 acres of planned second-growth and recently harvested acres. (This project is beyond the time limit for KV funding).

Treatment:

Precommercial thinning will occur in stands of 15 to 30 years of age. Crop tree spacing will generally be 12'X12' but can vary according to the silviculture prescription.

Wildlife Seeding of Specified Roads

Objective/Justification:

This project is consistent with Regional and Forest direction to maintain wildlife habitat capability. The objective is to provide forage in and adjacent to harvest units to Sitka black-tailed deer and black bear. Seeding should occur in the initial years after timber harvest before there is much vegetation growth in the harvest units, or inhibiting alder growth.

Treatment:

The log purchaser is responsible for seeding all temporary roads and landings used during the sale. Therefore, treatment will include seeding of specified road 2170100, a section of the Sunny Creek mainline road (0.79 miles). In the Clover Bay area roads # 2180000-1, 2180000-2, 2180000-3 and 2180000 -4; 2180100, 2180200, 2180300, 2180310, 2180320, 2180340, 2180400, 2180600 and 2180700 will all be closed and seeded (14.7 miles). In the Sallery Cove area the following roads will be closed and seeded as well: 2190000-1, and 2190000-2 and 2190100 (4.35 miles). This is a total of 19.84 miles of seeded roadbed. Seeding will be a mixture of native seed, if possible. Fertilizer and urea will also be applied at the same time as the seed. Application will be done during the timing window to allow adequate growth.

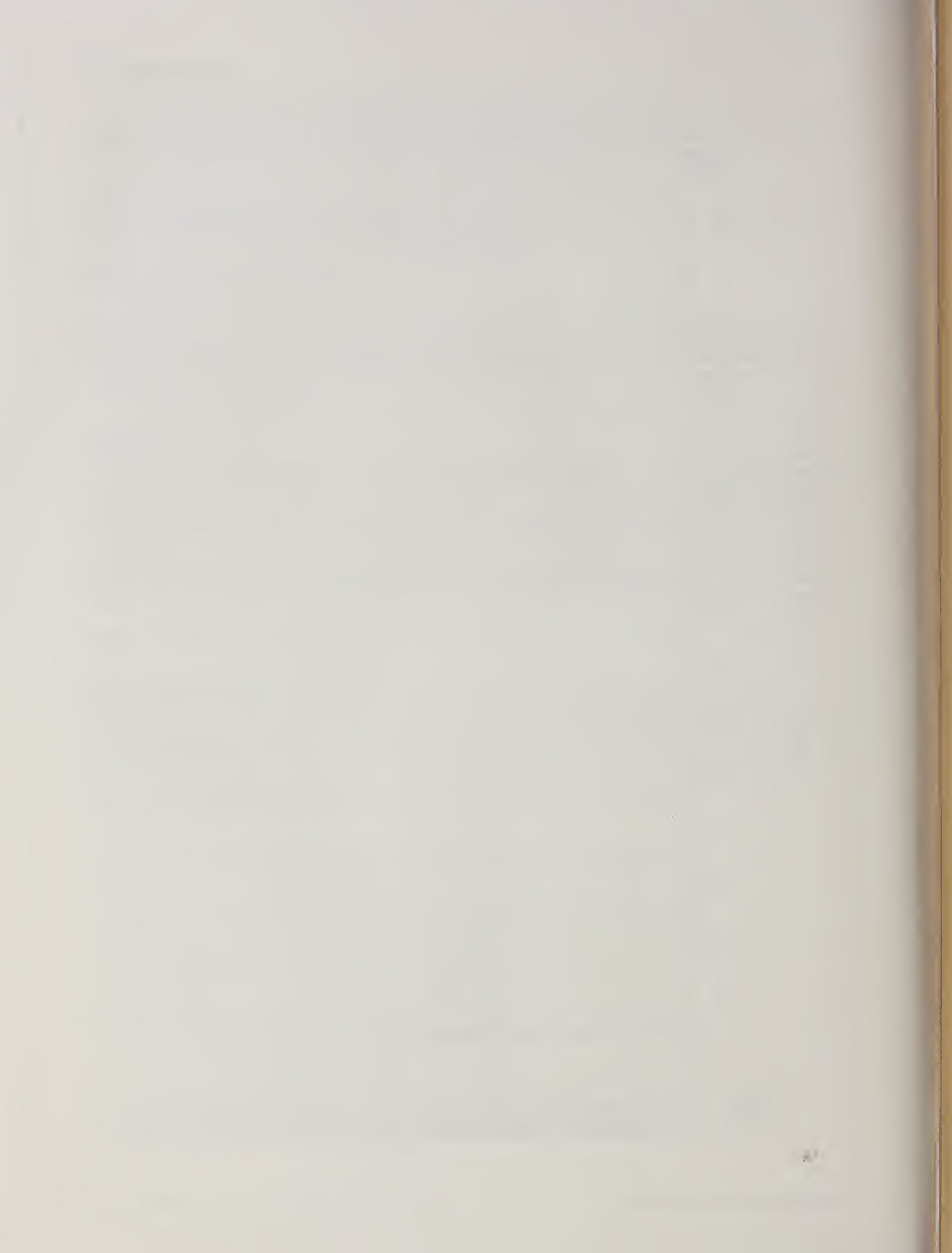
Wildlife Thinning

Objectives/Justification:

Variable spaced thinning would be used to open up the canopy to encourage growth of the understory vegetation while leaving dominant trees, creating tickets, mimicking and promoting the natural succession from a young-growth condition to a more diverse structure. The work would be contracted. Location could be in timber or non-timber emphasis land-use designations. Force account crews would be used for layout of the units, contract administration and monitoring. Monitoring will consist of four vegetative transects per 100 acres (2 people, 1 day).

Table G-1: SAI PLAN (TOTAL UNIT POOL)

CHOLMON- DELEY TREAT- MENT	REF #	REGEN SURV ALT 5 (acres)	HARV EVAL ALT 5 (acres)	PLT ALT 5 (acres)	SEED COLL ALT 5 (bushels)	SURV SURV ALT 5 (#)	RE- LEASE ALT 5 (acres)	PCT 15-20 ALT 5 (acres)	PCT 20-25 ALT 5 (acres)	PCT 25-30 ALT 5 (acres)	EX STD 13 YR. PCT (acres)	H2O SHED REHAB & STABIL (acres)	RECREAT. FISH DEVELOP. (miles)	WL PCT SEED (miles)	FISH PASS. ENHANCE (project)	OTHER		
																	UNIT #	ACRES
614-001	106	59	0	10	1	10	0	106										
614-002	59	15	0	5	1	5		59	15			1						
614-003	15	65	0	10	1	10			65			1						
614-004	65	21	0						21			1						
614-005	21	39	39															
615-025	39	0	0															
616-006	0	23	0	5	1	5				33								
616-007	33	30	30	5	1	5				36								
616-008	36	22	22									0.5						
616-010	22	63	15															
616-011	78	53	53	5	1	5			63			1						
616-012	58	65	3	5	1	5			65									
616-013	69	36	0	5	1	5				36								
616-016	36	12	12	5	1	5				12								
616-017	24	30	0	5	1	5				30		1						
616-018	30	17	0	5	1	5				17								
616-019	17	41	0						41			5						
616-021	41	23	15							23		1						
616-022	23	23	0							20								
616-023	23	25	0							30								
616-024	55	30	0				12		30									
616-123	30	71	0						71			5						
616-275	71	15	0	5	1	5				15								
617-009	15	5	4															
674-032	9	44	0				15			44								
674-537	44	14		5	1	5				13								
674-548	14	9	19					28										
674-549	28	13	13															
674-550	26	34	17															
674-551	34	0	0															
674-555	0	26	0	5	1	5				21								
674-583	26	0	0				0			0		drop						
675-027	0	16	0							16								
675-028	16	13	0				10			13		2						
675-029	13	67	0				25	50				1						
675-030	67	3	0							3								
675-031	3	32	10					32										
675-032	42	105	60				58	100				5						
675-033	105	43	0				25					5						
675-037	43	14	0	5	1	5												
676-462	14	5	0	2	1	2				10								
676-472	5	6	0															
676-484	6	17	0	5	1	5				21								
676-489	17	9	0															
676-500	9	9	0															
676-592	9		0															
outside of unit																		
Total	1511	0	1368	207	92	17	145	375	424	393	0	29.5	1.75	1.75	20	1		
															20	1		
																0		



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